



PLAN CHANGE 1 TO THE HURUNUI AND WAIAU RIVER REGIONAL PLAN

Draft Section 32 Evaluation Report

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Part A: Introduction and Planning Context

Introduction

Purpose

The Resource Management Act 1991 (RMA) requires regional councils, when amending regional plans, to prepare an evaluation report in accordance with section 32 of the RMA. The purpose of this report is to set out the evaluation that the Council has undertaken on proposed Plan Change 1 (referred to as Plan Change 1) to the Hurunui and Waiau River Regional Plan (HWRRP). It includes:

- The planning context within which the plan change sits;
- A summary of the issue that the plan change seeks to address;
- An outline of the development of the plan change and background information; and
- A summary of the options considered, and an evaluation of those options in accordance with section 32 of the RMA.

About the Plan Change

Plan Change 1 is a proposed change to the Hurunui and Waiau River Regional Plan (HWRRP). The HWRRP was made operative on 20 December 2013, and sets out a framework for the management of water quality and quantity in the Hurunui, Waiau and Jed catchments.

The HWRRP was the first catchment plan to be prepared under the Canterbury Water Management Strategy (CWMS) and the Environment Canterbury (Temporary Commissioners and Improved Water Management) Act 2010 (ECan Act 2010). The CWMS outlines a vision for the Region's water resources, sets principles and establishes targets for achieving the vision, and sets out a governance structure for achieving integrated management, including the establishment of 10 Water Management Zones, each with a Committee.

The Hurunui Waiau Zone Committee prepared a Zone Implementation Programme (ZIP) in July 2011 consistent with the direction in the CWMS, which included recommendations on how to address water management issues in the Hurunui Waiau Zone. The recommendations that required a statutory response were included within the HWRRP.

Since the Plan was made operative, several specific problems with plan implementation have become apparent. As a result of further investigations undertaken by the Hurunui Waiau Zone Committee and Canterbury Regional Council staff, it is clear that a change to the HWRRP is required to address particular issues that dryland farmers are experiencing with the suite of provisions, which manage land uses that may result in the discharge of nutrients to water, and how these provisions apply to dryland farming activities.

Following extensive investigation and consultations, the Hurunui Waiau Zone Committee has made further recommendations contained in an addendum to the ZIP¹.

The extent of the Plan Change

Plan Change 1 proposes a new suite of provisions to provide for low intensity dryland farming to operate as a permitted activity. Plan Change 1 also makes minor consequential changes to some existing provisions in the HWRRP in order to exempt normal dryland farming activities from rules that manage other types of farming.

A recommendation has been made to separate the proposed dryland provisions from the existing rule framework to limit the scope of the plan change. Plan Change 1 will not alter the provisions for any activity other than low-intensity dryland farming.

Plan Change 1 proposes to amend Part 3 - Rules (3.3 Cumulative Effects of Land Use on Water Quality), and Part 5 – Definitions, Schedules and Maps by:

- introducing a revised permitted activity rule framework for low intensity dryland farming, with conditions to assist with catchment accounting² and to manage nutrient loss and contaminant run-off through the use of Farm Management Plans;
- introducing new definitions and schedules to assist with the understanding and application of the new permitted activity rule for low intensity dryland farming; and
- minor consequential amendments.

Plan Change 1 does not propose to change the objectives in the HWRRP.

Approach to this s32 report

This s32 report summarises the evaluation of options that has taken place, including the evaluation that took place as a part of the collaborative process undertaken by Hurunui-Waiau Zone Committee (described as the CWMS process), beginning in 2016. Through this process, discussion, debate and evaluation of options has been undertaken with a wide range of stakeholders. The discussion, debate and evaluation is recorded in meeting minutes, technical reports and memos, and in papers presented to the Zone Committee and stakeholders.

This report draws on that record and where possible references appropriate documents. Regardless of whether documents are referenced in the body of this report, all of the supporting documents listed in Appendix 2 of this report comprise a part of the evaluation of options for this proposed plan change.

This evaluation report meets the Regional Council's obligations under s32 of the RMA.

¹ Hurunui Waiau Zone Implementation Plan and August 2018 Addendum

² Policy CC1 of the National Policy Statement for Freshwater Management requires Regional Councils to establish and operate a freshwater quality accounting system.

Assumptions made

Throughout this section 32 report, reference is made to a nitrogen load offset for the Hurunui catchment. While there is agreement in principle that this offset will be provided from within the consented loads of key irrigation schemes, at the time of writing, the specific mechanism by which that offset will occur has not been finalised. It is anticipated that a suitable mechanism will be developed through the planning process to provide the required level of confidence that the offset will occur. For the purpose of assessing the appropriateness, effectiveness and efficiency of proposed Plan Change 1, this section 32 report is predicated on the assumption that nitrogen load in the Hurunui river will be offset, and that there will be in place, a mechanism that achieves that outcome.

RMA Section 32

Proposed Plan Change 1 is a plan change to an existing regional plan (the HWRRP) that was prepared by the Canterbury Regional Council under the RMA in 2011. As part of the development of Plan Change 1 the Canterbury Regional Council is required to examine whether the proposal is the most appropriate way of achieving the objectives of the HWRRP, in accordance with section 32 of the RMA.

Section 32 of the RMA requires that an evaluation report for an amending proposal (in this case Plan Change 1) must:

- Examine the extent to which the purpose of Plan Change 1 is the most appropriate way to achieve the purpose of the RMA;
- Examine whether the provisions in Plan Change 1 are the most appropriate way to achieve the objectives of the HWRRP and the purpose of Plan Change 1, by:
 - Identifying other reasonably practicable options for achieving the objectives of the HWRRP and the purpose of Plan Change 1;
 - Assessing the efficiency and effectiveness of proposed provisions for achieving the objectives of the HWRRP and the purpose of Plan Change 1; and
 - Summarising the reasoning for deciding on the proposed provisions.

When assessing the efficiency and effectiveness of the proposed provisions the following assessment criteria must also be satisfied:

- The benefits and costs of the environmental, economic, social, and cultural effects anticipated from the implementation of the provisions must be identified and assessed;
- The benefits and costs are to be quantified (if practicable);
- The risks of acting or not acting must be assessed where there is insufficient or uncertain information.

The objectives of the existing plan (i.e., the HWRRP) must be considered where they are relevant to the purpose of the plan change and would remain if the plan change took effect.

The evaluation report must also summarise any relevant advice from iwi authorities, including the Council's response to that advice and any provisions that are intended to give effect to the advice.

Planning Context

The Resource Management Act 1991 (the RMA) provides the regulatory framework for the development of resource management planning documents. The RMA sets out the legislative hierarchy of these documents, including direction on what must be considered when preparing a plan or plan change. The hierarchy of RMA documents provides further background and guidance for the development of appropriate planning objectives at both a national and regional scale. This wider context includes a range of documents of particular relevance to proposed Plan Change 1, including:

- The Environment Canterbury (Transitional Governance Arrangements) Act 2016
- The National Policy Statement for Freshwater Management 2014 (amended 2017)
- The Canterbury Regional Policy Statement
- The Canterbury Land and Water Regional Plan
- Te Rūnanga o Ngai Tahu Freshwater Policy
- Te Rūnanga o Kaikōura Environmental Management Plan 2007
- Maahanui Iwi Management Plan 2013
- Te Whakatau Kaupapa Ngai Tahu Resource Management Strategy 1990

The RMA requires that Regional Councils when preparing a regional plan or plan change must:

- take into account iwi management plans³;
- not be inconsistent with other regional plans for the Region⁴; and
- give effect to regional and national policy statements⁵.

An evaluation of the proposal against these documents is not explicitly required in an RMA s32 evaluation report. Regardless, a summary of their relevance, along with other sections of the RMA, is contained in Appendix 1.

Development of the Plan Change

Background

The HWRRP contains provisions which seek to maintain and improve water quality in the Hurunui, Waiau and Jed River catchments. The plan contains objectives to manage the cumulative effects of land use on water quality including the management of concentrations of nutrients entering the mainstems of the Hurunui, Waiau Uwha and Jed rivers, and concentrations of nutrients entering tributaries to those rivers. The plan also contains policies and methods to manage the cumulative effects of land use on water quality, in particular, land use activities that result in the discharge of nutrients that may enter water.

³ RMA s66 (2A)

⁴ RMA s67 (4)(b)

⁵ RMA ss67(3)(a) and 67(3)(c)

Plan Change 1 to the HWRRP is proposed in response to calls from the Hurunui Waiau community to address inequity and implementation issues with the existing provisions, known as “the 10% rule”⁶

The issues and subsequent proposed changes addressed within this plan change are specific to dryland farming and do not extend to any other land use.

The proposed Plan Change is intended to recognise the relatively low impact of dryland farming on water quality by making catchment accounting and auditing requirements less costly than those for higher impact intensive farming activities, while allowing for annual variation in nutrient losses from dryland farming, subject to specific conditions to mitigate effects on the environment. There are around 580 sheep and beef farms⁷ in the Hurunui district, and it is estimated that 250⁸ of those farms, located in the Nutrient Management Area in the HWRRP⁹, do not irrigate.

The proposed Plan Change will provide for dryland farms to operate as permitted activities where:

- There is no irrigation and less than 10% of the total property area is used for winter grazing of cattle on root and brassica crops;
- Farmers report the area of winter grazing each year via the Farm Portal¹⁰, or via a farmer collective; and
- Farmers prepare and implement a Farm Management Plan that must be provided to the Canterbury Regional Council on request.

Proposed Plan Change 1 forms part of a wider solutions package, which includes regulatory and non-regulatory interventions. Those parts of the package that require a regulatory framework form part of Plan Change 1. In addition to the regulatory components of Plan Change 1, there is a proposal to off-set the effects of the Plan Change on nitrogen load in the Hurunui River by reducing the N load contributed by three irrigation schemes (Amuri irrigation, Hurunui Water Project and Ngāi Tahu Farming Enterprises). As stated above, the mechanism by which that offset will occur has not, at the time of writing, been finalised. However, it is anticipated that a sufficiently binding mechanism for this off-set will be developed.

Plan framework for existing land use

The HWRRP currently permits any existing land use¹¹ that results in the discharge of nitrogen (N) or phosphorus (P) which may enter water, provided the activity meets the following four conditions:

⁶ August 2018 Addendum to the Hurunui Waiau Zone Implementation Programme ZIPA

⁷ Hurunui zone limit setting process: Economic assessment of the current state. Harris, S. 2017

⁸ Estimated by identifying properties within Nutrient Management Area with no irrigation that are greater than 30ha in size

⁹ HWRRP Nutrient Management Area Map Series

¹⁰ farmportal.ecan.govt.nz

¹¹ Rule 10.1 of the HWRRP

- (a) the land must be subject to one of four “collective management agreements”¹² by 1 January 2017;
- (b) four years of OVERSEER™ data must be submitted to the Canterbury Regional Council by 31 October 2016.
- (c) The nitrate-nitrogen leached from a property must not contribute to any measured exceedance of water quality limits set out in Policy 5.3 and 5.3A; and
- (d) The water quality limits for drinking water must be met.

The collective agreement approach set out in the HWRRP enables community and industry-led audited self-management, where compliance with the permitted activity rules is reported back to the Canterbury Regional Council by the collective.

There is relatively low compliance with Rule 10.1.¹³ The majority of the non-compliance lies with dryland farms not having submitted OVERSEER™ data to the Canterbury Regional Council and/or having joined an approved collective. Council officers consider the low compliance is likely due to practical and financial difficulties in requiring all farms to prepare OVERSEER™ budgets, including the cost to farmers¹⁴ and a lack of capacity within the industry to prepare the budgets¹⁵.

Plan framework for changes in Land Use

Rule 10.2 of the HWRRP permits changes in land use subject to the same conditions as Rule 10.1 (see earlier), provided that the load limits specified in the HWRRP are met.

A “change in land use” is defined in the HWRRP as:

“For the purposes of this Plan, a change in land use, is calculated on a per property basis, and is determined as being an increase greater than 10% in the long term average release of Nitrogen or Phosphorus to land which may enter water, measured on a kg/ ha basis, but calculated on the gross load per property from the date this Plan is made operative.”

The load limits set out in Schedule 1 of the HWRRP consist of dissolved inorganic nitrogen (DIN) (T/year) and dissolved reactive phosphorus (DRP) (T/year) load limits at two monitoring sites in the Hurunui catchment (Mandamus flow recorder and the State Highway 1 flow recorder). Notably the Schedule 1 load limits are instream or in-river load limits, as opposed to “source” load limits used in some other plans in Canterbury and which are based on catchment-summed estimates of nitrogen and phosphorus lost from the root zone (i.e. “source”) on properties.

¹² means one of an Industry Certification System, a Catchment Agreement, an Irrigation Scheme Management Plan, or a Lifestyle Block Management Plan

¹³ An Assessment of the Efficiency and Effectiveness of the Hurunui and Waiau River Regional Plan. White, L 2018

¹⁴ *Pers. Comms*: Discussion between Lisa Jenkins and various farmers and Zone Committee members

¹⁵ Capacity for the Canterbury Regional Council and industry to efficiently process consents that would be required from dryland farmers under the “10% rule”. Jenkins, L. 2017

The HWRRP also permits changes in land use, subject to the same conditions as Rule 10.1 (see earlier), provided that the load limits specified in the HWRRP are met.

Where other conditions are not met, but the load limits are not exceeded, resource consent is required for the change of land use as a restricted discretionary activity under Rule 11.1. Where a load limit is exceeded, the activity status for a change of land use becomes non-complying pursuant to Rule 11.1A.

The effect of the definition of “change of land use”, is that it allows for an increase in the long term average N or P loss (per property) of up to 10% as a permitted existing land use (under Rule 10.1), with an increase beyond the 10% threshold becoming a “change” and subject to the conditions of Rule 10.2 to be a permitted activity.

Issues

Equity

When the Plan was promulgated, it was intended to provide for existing land uses to be able to continue to operate as a permitted activity, with the opportunity to increase nutrient losses by up to 10%¹⁶. When the plan provisions were applied to low intensity dryland farming, it was found that existing low intensity dryland farms, operating in the same way they have operated since prior to 2013, were likely to be considered to have changed their land use (and be subject to resource consent requirement). When small year to year changes occur, that are normal for dryland farming systems, increases in nutrient losses can exceed 10%.

Dryland farmers have informed Council staff and the Zone Committee they feel unreasonably constrained by the rule regime when compared to an irrigated farm. When compared to irrigated farms operating under the same framework, the 10% cap does not afford dryland farms the same flexibility as irrigated farms, nor even the capacity to continue operating as normal.

Dryland systems generally result in very low N loss rates (in the order of 10-20kg N/ha/year¹⁷). Irrigated farms typically have much higher nutrient loss rates. For example: an irrigated farm could lose 80kg N/ha/year and, under the HWRRP provisions, can increase losses by up to 8kg/N/ha/year as a permitted activity. On the other hand, a dryland farm with typical N loss rates of 10-15kg/N/ha/year can only increase N losses by 1-1.5kg N/ha/year and remain a permitted activity.

Normal year to year variations on dryland farms can lead to changes in loss rates greater than 10% in any given year. Because the base loss rate is so low, small normal changes to a dryland farm, made as part of yearly rotations or in response to variations in climate and market conditions (such as a change

¹⁶ Commissioners recommendation report on the HWRRP. Canterbury Regional Council, April 2013. Paragraph 153

¹⁷ Likely trends of dryland farming as a permitted activity in the Hurunui and Waiau Zone (In the context of water quality discussions). Brown, J 2018

in stock numbers or stock type ratios, or an increase in winter feed), can change loss rates by more than 10%¹⁸.

Since the plan was made operative, the Hurunui district experienced three years of drought conditions, where farm inputs were typically reduced in response to the climate (stock numbers reduced). During this period, modelled OVERSEER™ outputs (namely, N) are likely to have been much lower than what is typically produced on a property. There is a risk that a return to normal production will likely result in an increase in modelled N outputs that would be classified as a “change in land use”, resulting in a resource consent being required for effectively the same farming activity.

The Canterbury Regional Council advised farmers¹⁹, in 2015, that it will not prioritise the enforcement of the land use rules for dryland farmers where land use has not intensified. However, that advice has been challenged and at the time of writing, the Court has not yet made a determination. The Canterbury Regional Council considered it would be a more efficient use of resources to focus compliance and regulatory actions on higher emitting activities and provide support to dryland farmers to implement effective practices to manage the effects of nutrients on water quality (such as Collectives and farm environment plans)²⁰.

The Hurunui Waiau Zone Committee identified a number of principles it considered were appropriate to apply to all nutrient management to achieve a fair and reasonable approach²¹. Included in those principles was the principle that the level of regulation applied to any activity should be commensurate with the level of environmental risk imposed by that activity. Under the “10% rule” framework, dryland farming is more constrained than irrigated farming despite dryland farming having a lower relative environmental impact. In addition to the limited flexibility a 10% nutrient loss increase provides for, dryland farmers also consider the costs to farmers to comply with the OVERSEER™ requirements of rule 10.1 and the auditing function of collective agreements made pursuant to Rule 10.1 are not commensurate with the environmental risk posed by dryland farming.

Proposed Plan Change 1 seeks to address the equity issues associated with the definition of “change in land use” by introducing an additional permitted activity rule specific to the use of land for low intensity dryland farming activities. Plan Change 1 also seeks to apply a rule framework that is more commensurate with the level of environmental risk from Low Intensity Dryland Farming.

¹⁸ Likely trends of dryland farming as a permitted activity in the Hurunui and Waiau Zone (In the context of water quality discussions). Brown, J 2018

¹⁹ Advice Note: Dryland farming and triggering the land use change rules in the Hurunui and Waiau River Regional Plan (HWRRP). Environment Canterbury, July 2015

²⁰ Advice Note: Dryland farming and triggering the land use change rules in the Hurunui and Waiau River Regional Plan (HWRRP). Environment Canterbury, July 2015

²¹ August 2018 Addendum to the Hurunui Waiau Zone Implementation Plan

Nutrient limits

The NPSFM requires that where water is of a quality that meets national bottom lines and provides for community outcomes, it must be maintained. Where national bottom lines or community outcomes are not being met, water quality should be improved.

Community outcomes for water quality are set out in the Hurunui Waiau Zone Implementation Plan²². The HWRRP set water quality limits that deliver these community outcomes.

The HWRRP sets in-river load limits for Dissolved Inorganic Nitrogen (DIN) and Dissolved Reactive Phosphorus (DRP), as well as concentration limits for nitrate nitrogen and periphyton biomass limits for the Hurunui river²³. The HWRRP also sets nitrate nitrogen and periphyton biomass concentration limits on the Waiau Uwha river²⁴. The HWRRP manages land use to maintain water quality within these limits by evaluating the effects of changes in land use on the limits, through resource consent processes²⁵. There are no limits set for the Jed river.

The DRP and DIN load limits for the Hurunui river at SH1 in the HWRRP were exceeded in 2014 during a year with exceptionally high flows (which tends to result in higher calculated loads) but neither limit has been exceeded since then. Significant changes to irrigation practice (including conversion from predominantly border dyke, to predominantly spray irrigation in the Amuri Basin) has resulted in reduced DRP loads from Hurunui River tributaries on the Amuri Plains²⁶ and reduced DRP concentrations in the Hurunui River at State Highway 1. While the in-river load limit for DIN has not been exceeded since the exceptionally wet year in 2013-14, DIN concentrations have been increasing in some Hurunui tributaries and groundwater sites and in the Hurunui River mainstem at State Highway 1²⁷; the DIN load limit has been fully allocated²⁸.

Nutrient losses from dryland farming

Nitrogen

In order to determine if permitting “normal dryland farming” without a 10% cap on additional nutrient losses would result in additional N losses, the Zone Committee first evaluated options²⁹ to define parameters that describe “normal dryland farming”. The result of that evaluation was that

²² Hurunui Waiau Zone Implementation Programme. July 2017

²³ Policy 5.3, HWRRP

²⁴ Policy 5.3A, HWRRP

²⁵ Policy 5.3B, HWRRP

²⁶ Amuri Irrigation nutrient loads and management. Brown, P. 2017; and Sources of Manageable Phosphorus losses in the Hurunui and Waiau catchments. Meredith, 2017.

²⁷ What we know... about water quality in the Hurunui catchment: Results from current monitoring and investigations. Dynes, K., Norton, N. & Graham, H. 2017

²⁸ Information pending

²⁹ Fixing the 10% Rule issues and options. Canterbury Regional Council. 2017

farms with no irrigation and less than 10% of their area in winter grazing (of cattle on root or brassica crops) would be considered to be “normal dryland farming”.

Dryland farm system productivity is driven by genetics, feed type and farm configuration rather than stock density and farm inputs, meaning that without adding irrigation, options for intensifying farm systems (and increasing nutrient loss rates) are limited³⁰. For this reason, it was considered appropriate to limit the application of the less onerous regulatory framework in the proposed plan change to non-irrigated farms only.

Break-feeding cattle on root and brassica crops (“winter grazing”) is a common practice that can increase nutrient losses from a farm. For this reason, stakeholders, the Zone Committee and Council officers considered it reasonable to limit the permitted area of winter grazing³¹. Following some scenario modelling³², stakeholders indicated a maximum area of 10% of the property for winter grazing is appropriate as it enables some flexibility for farmers who are able to support more stock over winter. This limit is similar to the permitted activity threshold for winter grazing in the Land and Water Regional Plan which applies to parts of the Canterbury Region.

To understand the likely impact of the proposed plan change, the Council consulted with local farmers and relevant farm experts who indicated that while a few farms may maximise the permitted winter grazing capacity, the majority of farms are unlikely to increase the amount of winter grazing. Further investigation was conducted to test that assumption³³, and the result of that investigation was that it is very unlikely that winter grazing area will increase by more than 50% above current.

Within the Hurunui and Waiau catchments, only around 3% of total dryland area is anticipated to be used for winter grazing. This is supported by information provided by Beef + Lamb New Zealand and the Hurunui District Landcare Group. In summary, without irrigation winter grazing crops are a high financial risk to dryland farmers, and do not provide a significant economic benefit. In years with market drivers that seemingly would encourage dryland farmers to maximise winter grazing areas

³⁰ Likely trends of dryland farming as a permitted activity in the Hurunui and Waiau Zone (In the context of water quality discussions). Brown, J. 2018

³¹ Zone Committee paper: 03 Plan options for making dryland a permitted activity January 2018. Jenkins, L. January 2018

³² Modelling changes in Hurunui and Waiau catchment root zone nitrogen losses from hypothetical scenarios of permitted winter forage development. Mojsilovic, O. 2018; and Summary of process to estimate the nitrogen load increase that would need to be offset in the Hurunui catchment as part of fixing the dryland farming “10% rule” issue. Norton, N. April 2018; and Estimating the ‘plausible worst case’ increase in nitrogen load from a new way of permitting ‘normal dryland farming’, that would need to be offset by decreases elsewhere in order to stay within the Hurunui Waiau River Regional Plan (HWRRP) nitrogen load limit. Norton, N. March 2018

³³ Likely trends of dryland farming as a permitted activity in the Hurunui and Waiau Zone (In the context of water quality discussions). Brown, J. 2018

(e.g. in 2007/2008 when high dairy prices were high³⁴ and there was a good market for dairy support grazing and where there were no regulatory hurdles), winter grazing area in North Canterbury only increased by around 30% above average³⁵ (which would equate to approximately 2.5% of the total dryland area). Because of this, when assessing the likely effects of the plan change, it was not considered necessary to assess a scenario where the maximum permitted area is used for winter grazing. Instead, a 50% increase (or 3% of the total dryland area) above average dryland winter grazing areas was assessed as being sufficiently precautionary – this was termed the “plausible worst-case scenario” in recognition of its distinction from what might be termed the theoretical (but implausible) worst-case (i.e., full uptake of 10% of property area in winter grazing across all dryland farms in the catchment).

It is worth noting here, that despite identifying that it is not plausible that winter grazing will increase by more than 50% at a catchment scale, it is still important that individual farms have the flexibility to use up to 10% of their area for winter grazing. This recognises the different conditions that exist farm to farm and year to year. Where some farms will have no winter grazing others may have up to 10% of their farms in winter grazing, and catchment wide the total area is most likely to remain about the same but could plausibly increase by up to 50%.

Phosphorus

It is anticipated that the proposed Plan Change will not result in additional phosphorus loading within any of the catchments.

Phosphorus enters rivers primarily via over-land run-off. Phosphorus loss pathways can be readily identified, targeted and managed. The most significant source of manageable phosphorus losses is from irrigated land uses, and as noted above significant reductions in phosphorus have been achieved in Amuri Plains tributaries in recent years, with some further gains likely still to come³⁶. Management practices designed to limit over-land run-off, and erosion/sediment loss to waterbodies, will effectively mitigate additional phosphorus loss from dryland farming. This mitigation, combined with the observed significant reductions in phosphorus from irrigated land uses, as well as a constraint on the total area of permitted winter grazing (the highest nutrient loss risk activity for dryland farms) is the basis for expecting that phosphorus concentration and load limits will be achieved under the proposed Plan Change

The proposed Plan Change ensures phosphorus management practices are implemented on dryland farms by requiring a Farm Management Plan template to be prepared and implemented in accordance with a proposed Farm Management Plan template (Schedule 6). The Farm Management Plan template requires all landowners to identify the actions undertaken to implement the

³⁴ Overview of the Sheep and Beef farming in Hurunui. Beef + Lamb New Zealand. 2018. Note: winter feed area referred to in this presentation includes all winter feed and not just cattle on root and brassica

³⁵ Likely trends of dryland farming as a permitted activity in the Hurunui and Waiau Zone (In the context of water quality discussions). Brown, J. 2018

³⁶ Amuri Irrigation nutrient loads and management. Brown, P. 2017; and Sources of manageable phosphorus losses in the Hurunui and Waiau catchments. Meredith, A. 2017

phosphorus and run-off management practices applicable to their property and farming activity. In particular, the proposed Farm Management Plan requires the landowner to identify any source areas for phosphorus loss, and on-farm actions include the exclusion of stock from waterbodies (in accordance with regional plan rules and/or resource consents), and actions to implement buffer strips and/or riparian margins from waterbodies to mitigate phosphorus losses. The Canterbury Regional Council has a significant work programme in place to promote Good Management Practice (GMP), and in the Hurunui Waiau Zone there is farmer support provided by land management advisors and other Zone focused staff³⁷. Farm Management Plans will also help to manage risks to water quality from other contaminants such as sediment, and bacteria such as *E. coli*.

Maintaining water quality

The proposed Plan Change will not result in additional P entering the Hurunui, Waiau or Jed rivers.

It is likely that Plan Change 1 will result in additional nitrogen load from dryland farming in the Hurunui and Waiau Uwha catchments³⁸. However, due to the small increases in N loading likely in the Waiau Uwha river, and actions taken to offset additional N loading in the Hurunui river³⁹, it is anticipated that water quality will be maintained, within Plan limits.

Hurunui river

Plan Change 1 may result in additional N load reaching the Hurunui river as a result of the increased operational flexibility provided for dryland farming. Modelling suggests that if winter grazing on dryland properties was to increase in area by the “plausible worst case” of 50%, overall N losses from dryland will increase by around 14% for dryland between SH1 and Mandamus⁴⁰ (4% greater than the HWRRP currently anticipates under the “10% rule”) and about 10% for dryland upstream of Mandamus⁴¹ (currently anticipated by the Plan). The 14% increase in N loss from dryland farming below Mandamus and 10% increase above Mandamus corresponds to a “plausible worst case” increase, over and above the 2013 baseline, of approximately 38t/N/year additional N source load lost from dryland farms in the Hurunui catchment above SH1, which is the equivalent of an 18t N/year increase in in-river load at SH1⁴².

³⁷ Zone Committee Paper 10 Review of Zone Delivery Work Programme. Hulse, P. March 2018

³⁸ Likely trends of dryland farming as a permitted activity in the Hurunui and Waiau Zone (In the context of water quality discussions). Brown, J. 2018

³⁹ Details pending

⁴⁰ Likely trends of dryland farming as a permitted activity in the Hurunui and Waiau Zone (In the context of water quality discussions). Brown, J. 2018

⁴¹ Estimating the ‘plausible worst case’ increase in nitrogen load from a new way of permitting ‘normal dryland farming’, that would need to be offset by decreases elsewhere in order to stay within the Hurunui Waiau River Regional Plan (HWRRP) nitrogen load limit. Norton, N. 16 March 2018.

⁴² Summary of process to estimate the nitrogen load increase that would need to be offset in the Hurunui catchment as part of fixing the dryland farming “10% rule” issue. Norton, N. 2018

The theoretical worst case increase that could arise under the current permitted activity provisions of the HWRRP (i.e., if all dryland farms above and below Mandamus upstream of SH1 increased their 2013 baseline N loss by 10%) is estimated to be approximately 30 t/N/year source load (14t/N/year in-river load)⁴³. Thus, Plan Change 1 could result in 8t N/year source load (4t N/year in-river load) greater increase than the existing permitted activity provisions. The process and methods used to generate all the above load increase estimates were developed with the Zone Committee and the Hurunui Science Stakeholder Group and have been summarised⁴⁴.

In order to prevent an increase in DIN load, so that water quality can be maintained or improved, the three biggest irrigators in the catchment (Hurunui Water Project, Amuri Irrigation Company and Ngāi Tahu Farming Enterprises) have agreed to offset anticipated additional dryland losses by reducing the amount of N lost on irrigated properties within their scheme areas⁴⁵. At the time of writing, the offset will most likely occur via a combination of improved on-farm practice and removal of some of the nitrogen load from some Amuri Plains tributaries of the Hurunui River, by abstracting water from those tributaries and re-applying the nitrogen rich water to land⁴⁶.

Waiau Uwha River

The Proposed Plan Change is not likely to cause the periphyton limits on the Waiau Uwha river to be exceeded. Periphyton currently is within limits on the Waiau Uwha, and additional nitrogen load from dryland farming is unlikely to result in a change in the overall quality of water in the river⁴⁷.

The “plausible worst case” estimate of approximately 14% increase in nitrogen losses from dryland farms in the catchment is slightly greater than the worst case 10% increase allowed under the current permitted activity “10% rule” provisions. This amounts to, at worst, approximately a 3% increase in total catchment nitrogen load at the Waiau Uwha mouth⁴⁸.

The HWRRP does not set nutrient load limits for the Waiau Uwha River and the nutrient loads necessary to achieve periphyton limits in the Waiau Uwha River have not been technically determined; this is a matter that has been signalled by the Zone Committee and Environment

⁴³ Estimating the ‘plausible worst case’ increase in nitrogen load from a new way of permitting ‘normal dryland farming’, that would need to be offset by decreases elsewhere in order to stay within the Hurunui Waiau River Regional Plan (HWRRP) nitrogen load limit. Norton, N. 16 March 2018.

⁴⁴ Summary of process to estimate the nitrogen load increase that would need to be offset in the Hurunui catchment as part of fixing the dryland farming “10% rule” issue . Norton, N. 12 April 2018

⁴⁵ Details pending

⁴⁶ Details pending

⁴⁷ What do we currently know?... about surface water quality... & land use... in the Waiau River catchment... Dynes, K. *et al.* 2017

⁴⁸ What do we know about future nutrient losses in the Waiau catchment from both irrigated and dryland development, and under different assumed amounts of permitted winter grazing of forage crops? Norton, N. 29 January 2018.

Canterbury to be addressed in a subsequent process⁴⁹ and new periphyton monitoring in the lower Waiau mainstem (SH1) has been initiated in 2018 to assist with this future purpose.

In the meantime, it is assessed as unlikely that the additional N entering the Waiau Uwha River will have a significant impact on periphyton growth in the Waiau river and it is not anticipated that the proposed plan change will cause periphyton limits in the Waiau Uwha River to be reached or exceeded. This is supported by the Dynes and Norton memo⁵⁰ which found that the Waiau Uwha mainstem shows a low susceptibility for nuisance periphyton growth due to the frequency of effective flushing flows. While increased nitrogen concentrations in the lower mainstem would technically increase the risk of periphyton growth during occasional periods of stable low flow, the increased risk from nutrients from dryland farming under the proposed Plan Change 1 is very small compared to the nutrient contributions from current and proposed irrigated development and would be unlikely to cause a breach of the periphyton limits without further irrigation development. At time of writing Emu Plains Irrigation is pursuing resource consent for further irrigation development and it is anticipated that the risk of combined effects of cumulative increases in nutrient losses will be assessed and tested in hearings for that process.

Jed River

The Jed river runs intermittently and land use in its catchment is limited by low rainfall and difficult access to irrigation water. It is unlikely that the proposed Plan Change will result in additional winter grazing in the parts of the catchment where farms are not irrigated because there is limited capacity for winter grazing to increase⁵¹.

Catchment accounting and the Farm Portal

The NPSFM requires that Regional Councils establish and operate a system to account for the quality and quantity of freshwater within a freshwater management unit⁵². The operative HWRRP requires farmers to report nutrient loss rates in the form of OVERSEER™ outputs. Farmers currently can report OVERSEER™ information directly to the Canterbury Regional Council or provide that information to a catchment collective⁵³ who must report on the overall losses from the collective area⁵⁴. Dryland farmers consider the cost of preparing OVERSEER™ information to be overly onerous given the relatively low environmental impact of dryland farming compared to irrigated farming. In addition,

⁴⁹ August 2018 addendum to the Hurunui Waiau Zone Implementation Plan; and Zone Committee paper 06 Waiau WQ limits. Jenkins, L. March 2018

⁵⁰ What are the predicted environmental effects of a percent increase in nitrogen and phosphorus for the Waiau River catchment?

⁵¹ Evidence pending at Schedule 1 draft stage

⁵² Section CC of the NPSFM (2014)

⁵³ The body administering an industry or catchment agreement or management plan under Rule 10.1, condition (a)

⁵⁴ HWRRP Schedule 2 (1)(f)

the Canterbury Regional Council do not consider receiving OVERSEER™ information from dryland farmers is a priority⁵⁵, as there is currently a lack of capacity within the industry to produce the OVERSEER™ information⁵⁶. Given the proposed dryland farming rules do not require dryland farmers to operate within a loss-rate envelope, there is no real purpose under the proposed framework to require OVERSEER™ information.

However, there is a need for the CRC to have a freshwater accounting system in place. The CRC is developing a freshwater accounting system. That system is known as the Farm Portal⁵⁷. The Farm Portal is an online spatial data portal that uses information such as soil type and rainfall data, in conjunction with information provided by farmers about farm systems and practices, to estimate nutrient loss rates from farming activities. The Farm Portal provides a mechanism for the Regional Council to gather information and then use it to generate estimated nutrient loss rates for permitted farming activities.

The Canterbury Regional Council developed the Farm Portal for two key purposes: to enable the Council to fulfil its freshwater accounting obligations as required by the NPSFM; and to provide users with an estimate of nutrient leaching losses (in kg/N/ha/yr) for farming activities if operated at Good Management Practice. The Farm Portal was incorporated into Plan Change 5 to the Canterbury Land and Water Regional Plan (LWRP) by direct reference through the provisions in the plan. The Farm Portal, and the appropriateness of including this tool in a regional plan, was duly tested through the Plan Change 5 process, and was recommended to be retained by the Hearing Panel.

Consultation on the use of the Farm Portal for catchment accounting purposes indicated that some farmers in the Hurunui Waiau Zone would not be happy to provide individual farm information through the Farm Portal, because they value anonymity⁵⁸. For this reason, the Zone Committee considered it appropriate that the proposed plan change gives farmers an option to report either via the Farm Portal or via a farmer collective⁵⁹.

The requirements for collectives, established in accordance with Schedule 2 of the HWRRP, are considered to be overly onerous for dryland farms⁶⁰. It is not considered necessary for dryland farmer collectives to audit on-farm practice. It is also not regionally consistent for dryland farms with a nitrogen loss rate of less than 20kg/N/ha, or with less than 10% of property area in winter grazing, to

⁵⁵ Advice Note: Dryland farming and triggering the land use change rules in the Hurunui and Waiau River Regional Plan (HWRRP). Environment Canterbury, 2015.

⁵⁶ Capacity for the Canterbury Regional Council and industry to efficiently process consents that would be required from dryland farmers under the “10% rule”. Jenkins, L. 2017

⁵⁷ farmportal.ecan.govt.nz

⁵⁸ *Pers. Comms.* Between Lisa Jenkins and various farmers and Zone Committee members

⁵⁹ Consultation Booklet: Farm Plans and catchment accounting. Environment Canterbury June 2018

Zone Committee paper: 09 collectives and accounting recommendations July 2018. Jenkins, L. 2018

⁶⁰ August 2018 Addendum to the Hurunui Waiau Zone Implementation Programme

be subject to auditing. For this reason, the proposed plan change provides the option for dryland farmer collectives to be set up, with the limited purpose of reporting winter grazing area in aggregate.

Consultation

The issues with the HWRRP framework, as it relates to dryland farming, were identified by both the Hurunui Waiau Zone Committee (in consultation with the local community) and Canterbury Regional Council officers as a result of implementing the HWRRP. These proposed changes seek to amend the current provisions to more efficiently and effectively manage dryland farming and the associated discharge of contaminants. As a result, consultation undertaken as part of the plan change process has largely occurred through the Hurunui Waiau Zone Committee.

The consultation with the Hurunui Waiau Zone Committee was informed by a Science Stakeholder Group, formed to provide specific input to a number of technical matters that require addressing within the Hurunui and Waiau Uwha River catchments. The organisations invited to be a part of the Science Stakeholder Group is included in the Terms of Reference for the Science Stakeholder group⁶¹. A record of the meetings held with the science stakeholder group is included in the documents that support this section 32 report.

Consultation has included public and targeted stakeholder meetings spanning 18 months, and has covered both the general aspects of the proposal (such as the scope and purpose of the Plan Change) and specific detail of the proposal (such as the definition of “low Intensity Dryland Farming”. Meetings have been held with individuals representing various organisations including (but not limited to) Beef and Lamb, Fish and Game and Irrigation Companies. CRC staff have also attended meetings with groups such as farm discussion groups and the Hurunui District Landcare Group to discuss the proposed Plan Change, seek feedback and provide clarification. Public meetings have been held to engage dryland farmers and seek feedback on proposed direction of the plan change. There have been extensive discussions throughout meetings of the Hurunui Waiau Zone Committee in which members of the public have had opportunity to provide feedback and seek clarification on detailed aspects of the proposal⁶².

Issues and options papers were sent to stakeholders covering the more general issues with the 10% rule framework and high-level options to “fix” that framework, and the more specific options around catchment accounting and phosphorus and run-off management. Stakeholder feedback was sought on those issues and options papers.

⁶¹ Science Stakeholder Group meeting notes: 00 TOR Hurunui Science Stakeholder Group 18 Oct 16

⁶² A full record of Zone Committee meetings, including minutes can be viewed at the following website:

<https://www.ecan.govt.nz/your-region/your-environment/water/whats-happening-in-my-water-zone/hurunui-waiiau-water-zone/>

Summary of proposed changes

Plan Change 1 forms part of a wider solutions package that addresses current plan implementation issues for low intensity dryland farmers, while ensuring that requirements set out in the NPSFM and water quality limits (in particular, the load limit for the Hurunui River⁶³) are met.

Plan Change 1 consists of the following amendments to the HWRRP:

- New Rule 10.1A permitting dryland farming activities provided that each property is either:
 - (i) part of a Dryland Farmer Collective Agreement (where the compliance with the permitted activity rule is recorded by the collective and reported back to the Canterbury Regional Council); or
 - (ii) registered in the ECan Farm Portal; and
 - (iii) a Farm Management Plan is prepared and implemented for the property;
- New definitions of “low intensity dryland farming”, “winter grazing” and “Dryland Farmer Collective Agreement” to assist with the implementation of new Rule 10.1A.
- Amendment to the definition of “change in land use” so that activities that meet the definition of “low intensity dryland farming” are not considered to have changed land use if nutrient losses exceed 10% above a 2013 baseline.
- New Schedules 2A and 6 detailing the requirements of “Dryland Farmer Collective Agreement” and “Management Plan” (respectively).
- Consequential amendments to Rules 10.1 and 10.2

The wider solutions package includes an off-set of N load in the Hurunui catchment. This offset will be achieved through a reduction in N being contributed by irrigated land use⁶⁴.

⁶³ Load limits are set out in Schedule 1 of the HWRRP.

⁶⁴ Details pending

Part B: Evaluation

Method

The following sections set out the approach taken in this evaluation report to meet the requirements of section 32 of the RMA. The full text of section 32 is set out in Appendix 1. In summary, section 32(1)(b) of the RMA requires that an evaluation report examine whether the proposed provisions (including policies, rules, associated tables, maps and schedules) in Plan Change 1 are the most appropriate way of achieving the HWRRP objectives.

To determine this, the Canterbury Regional Council has carried out an evaluation for the provisions of Plan Change 1 that:

- Identifies the purpose of Plan Change 1 and examines the extent to which that purpose is appropriate for achieving the purpose of the Act
- Identifies the most relevant HWRRP objectives against which an assessment is undertaken to determine if Plan Change 1 is the most appropriate way of achieving those objectives including by;
 - Identifying other reasonably practicable options for achieving the purpose of Plan Change 1 and the relevant HWRRP objectives (s32(1)(b)(i));
 - Examining the efficiency and effectiveness of the proposed provisions for achieving purpose of Plan Change 1 and the identified HWRRP objectives (s32(1)(b)(ii));
 - Providing an overall evaluation summary of the reasons for deciding on the Plan Change 1 provisions (s32(1)(b)(iii)); and
 - Using a level of detail in the assessment that corresponds with the scale and significance of the effects anticipated from the implementation of the Plan Change 1 provisions (s32(1)(c)).

The section 32 evaluation does not include full details of the technical assessments undertaken that support Plan Change 1. A full list of the technical reports and other information relied on is included in Appendix 2 of this report.

Approach to Efficiency and Effectiveness Assessments

The terms 'efficiency' and 'effectiveness' are not defined in the RMA. For the purpose of this evaluation, 'efficiency' is broadly interpreted to mean the provisions that will achieve the HWRRP objectives and the purpose of Plan Change 1 at the lowest overall cost to the regional community. 'Effectiveness' is interpreted as how successfully the provisions will achieve the HWRRP objectives and the purpose of Plan Change 1.

The assessment of the efficiency and effectiveness of the proposed provisions relates to both the achievement of the HWRRP objectives and the purpose of Plan Change 1. While all the objectives must be considered, some are more relevant than others for the evaluation of the proposed provisions. For assessment purposes, both efficiency and effectiveness are therefore assessed against the objectives of particular relevance to the proposed provisions.

The efficiency and effectiveness assessment must also identify and assess the benefits and costs of the environmental, economic, social, and cultural effects that are anticipated from the implementation of the provisions, including expected changes to economic growth and employment opportunities ((section 32(2)(a)). Where practicable, costs and benefits should be quantified (section 32(2)(b)). It is noted that social, cultural and environmental effects are often difficult to monetise. However, where possible quantification has been undertaken to inform an understanding of the magnitude of the effect.

When evaluating benefits and costs, the starting point used is the current environment and the policy and rule framework of the HWRRP. This approach means that the identified costs and benefits of the proposed provisions are a comparison against the status quo. While section 32 of the RMA does not explicitly require alternative options to be assessed with respect to their effectiveness or efficiency in achieving the HWRRP objectives and the purpose of the plan change, this approach does enable a comparative assessment of the available options against the status quo and the proposed provisions. A summary of some comparative assessment of specific options undertaken can be seen in Zone Committee papers⁶⁵. This approach assists in demonstrating why the provisions in proposed Plan Change 1 are the most appropriate method to achieving the HWRRP objectives and the purpose of Plan Change 1.

Scale and significance

Section 32(1)(c) requires that the section 32 evaluation report must contain a level of detail that corresponds to the scale and significance of the environmental, economic, social, and cultural effects that are anticipated from the implementation of the proposal.

The level of detail contained in the evaluation section of this report reflects the scale and significance of the changes proposed, and includes an evaluation of the proposed changes compared to the status quo provisions. This means the assessment provides a measure of the level of change expected from the implementation of the proposed provisions.

Evaluation

The proposed changes to the HWRRP form part of a wider implementation package that does not exclusively rely on plan provisions. Within the wider solutions package, there is a strategy for offsetting increases in N load so that water quality (specifically the nitrogen load limits) can be maintained in the Hurunui River⁶⁶. There is also a Zone work programme in place to assist farmers in the identification of farm practices that will assist in the management of phosphorus and sediment

⁶⁵ Zone Committee papers:

- 03 Plan options for making dryland a permitted activity. Jenkins, L. January 2018
- 05 collectives and catchment accounting. Jenkins, L. March 2018
- 09 collectives and accounting recommendations. Jenkins, L. July 2018

⁶⁶ Detail pending

run-off⁶⁷. The efficiency and effectiveness evaluation has been undertaken with the assumption that the wider solutions package is implemented.

Section 32(1)(a) examination of the extent to which the objectives of the proposal being evaluated are the most appropriate way to achieve the purpose of the RMA.

The RMA requires an examination of whether the objectives of Plan Change 1 (in this case, the purpose of the Plan Change⁶⁸) being evaluated are the most appropriate way to achieve the purpose of the Act⁶⁹.

Purpose of Plan Change 1 to the HWRRP

Plan Change 1 to the HWRRP seeks to establish an alternative rule framework for dryland farmers operating as a permitted activity. In accordance with the CWMS “preferred approach”⁷⁰, the proposed plan change should be consistent with the recommendations made by the Zone Committee⁷¹ following a collaborative process. To that end, the purpose of the proposed Plan Change is to reduce the regulatory burden on low impact dryland farming while:

- Achieving a regulatory framework for dryland farming that is commensurate with established low environmental impact from dryland farming
- Giving effect to NPSFM requirements to maintain or improve water quality
- Giving effect to NPSFM requirements to account for nutrient losses at a Freshwater Management Unit (catchment) level; and
- Encouraging the implementation of farm management practices, particularly for the management of phosphorus and sediment loss

Plan Change 1 has been designed to promote the sustainable development of resources in a more effective way than the status quo. The Status quo is unlikely to be a better way of achieving the purpose of the Act because the Hurunui Waiau community do not support the implementation of the Plan in its current form as it relates to dryland farming.

The purpose of Plan Change 1 will promote sustainable management of natural and physical resources by:

⁶⁷ Zone Committee workshop paper: 10 Review of Zone Delivery Work Programme. Hulse, P. and Brown, I. March 2018

⁶⁸ RMA s32(6)

⁶⁹ RMA s32(1)(a)

⁷⁰ The Preferred Approach for Managing the Cumulative Effects of Land Use on Water Quality in the Canterbury Region: A Working Paper. Environment Canterbury. January 2012.

⁷¹ August 2018 Addendum to the Hurunui Waiau Zone Implementation Programme.

- Enabling the Hurunui Waiau community to provide for their social wellbeing by progressing a Plan Change to achieve outcomes that have been collaboratively agreed, and through addressing perceived inequities inherent in the planning framework;
- Enabling the Hurunui Waiau community to provide for their economic wellbeing by providing for the continued use of land for low intensity dryland farming, an activity that has occurred in the Hurunui Waiau Zone for over 100 years;
- Enabling the Hurunui Waiau community to provide for their cultural wellbeing by operating within community agreed environmental limits and recognising opportunities to provide for the relationship of Māori with their culture and traditions, specifically through the recognition of mahinga kai values in the implementation of farm management practices.

Plan Change 1 recognises the need to sustain the potential of natural and physical resources to meet the reasonably foreseeable needs of future generations as its purpose includes enabling dryland farming as a permitted land use while maintaining water quality. The life supporting capacity of the environment, and in particular soil, water and ecosystems will be safeguarded through the implementation of farm practices and by operating to water quality limits. The purpose of Plan Change 1 includes the avoidance and mitigation of adverse effects on the environment

Overall, the purpose of Plan Change 1 a highly appropriate way to promote the sustainable management of natural and physical resources in relation to dryland farming within the Hurunui Waiau Zone.

Section 32(1)(b) examination of whether the provisions in the proposal are the most appropriate way to achieve the objectives of the Plan.

Section 32(1)(b) of the RMA requires an examination of whether the provisions of the Plan Change are the most appropriate way of achieving the Objectives of the HWRRP⁷² and, for an amending proposal that does not include objectives, the examination must also consider if the provisions of the plan change are the most appropriate way to achieve the purpose of the Plan Change.

The HWRRP Objectives that are relevant to Plan Change 1 are Objectives 5.1 and 5.2.:

Objective 5.1

Concentrations of nutrients entering the mainstems of the Hurunui, Waiau and Jed rivers are managed to:

(a) protect the mauri of the waterbodies;

(b) protect natural biota including riverbed nesting birds, native fish, trout, and their associated feed supplies and habitat;

(c) control periphyton growth that would adversely affect recreational, cultural and amenity values;

⁷² RMA s32(1)(b) and s32(3)(b)

- (d) ensure aquatic species are protected from chronic nitrate toxicity effects; and,*
- (e) ensure concentrations of nitrogen do not result in water being unsuitable for human consumption.*

Objective 5.2

Concentrations of nutrient entering tributaries to the Hurunui, Waiau and Jed rivers are managed to ensure they do not give rise to:

- (a) chronic nitrate toxicity effects on aquatic species; and,*
- (b) water being unsuitable for human consumption*

For completeness, the purpose of Plan Change 1 is to reduce the regulatory burden on low impact dryland farming while:

- Achieving a regulatory framework for dryland farming that is commensurate with established low environmental impact from dryland farming
- Giving effect to NPSFM requirements to maintain or improve water quality
- Giving effect to NPSFM requirements to account for nutrient losses at a Freshwater Management Unit (catchment) level; and
- Encouraging the implementation of farm management practices, particularly for the management of phosphorus and sediment loss

Reasonably Practicable Options

A number of reasonably practicable options were identified to manage dryland farming activities in the Hurunui and Waiau catchments. These included:

1. Implementing the operative provisions of the HWRRP;
2. Providing a more enabling permitted activity framework for various levels of land use intensity including some irrigation⁷³; and
3. Various alternatives that minimise phosphorus and sediment run-off and enable freshwater accounting obligations to be met.

These other options were evaluated and dismissed because they were not considered to achieve the purpose of the plan change or were not considered to be more efficient or effective means for achieving the Objectives of the HWRRP than the proposed option. A summary of the planning evaluation of these options is contained within various Zone Committee meeting agenda papers⁷⁴.

⁷³ Fixing the 10% rule: issues and options. Jenkins, L. 2017

⁷⁴ 03 Plan options for making dryland farming a permitted activity. Jenkins, L. 2018

04 Dryland farming and offsets recommendations (Recommendations: Fixing the 10% rule). Jenkins, L. 19 March 2018.

Option 1 – Status Quo (HWRRP provisions)

The operative land use rules would still apply to dryland farming activities.

Option 2 – Proposed Plan Change 1 including a new rule framework for low intensity dryland farming activities

This option amends the HWRRP to include a new rule framework for low intensity dryland farming activities that requires all low intensity dryland farmers to prepare and implement a Farm Management Plan and register their property in the Farm Portal or become a part of a dryland farmers collective agreement. This option includes the addition of two new schedules setting out the requirements for dryland farmer collective agreements and farm management plans. This option also includes the addition of new definitions for “low intensity dryland farming”, “Farm Portal”, “winter grazing”, and amendments to the definition of “change of land use”.

Effectiveness

The evaluation considers the effectiveness of the proposed plan change, compared to the status quo, in achieving the Objectives of the HWRRP. The evaluation also considers the effectiveness of the proposed plan change in achieving the purpose of the plan change.

Proposed amendments

The policy framework in the HWRRP remains unchanged. The proposed amendments to the rule regime provide an alternative regulatory pathway for dryland farmers, which maintains the tributary based and community approach for managing water quality, as set out in the policies. The proposed rule regime requires dryland farmers to prepare farm management plans, ensuring that all land owners implement nutrient management practices that contribute to the maintenance of current standards of water quality.

This option has lower administrative requirements for both the Canterbury Regional Council and landowners, which will likely result in higher compliance with the rule requirements. Farmers have told us they consider the requirements of Rule 10.1 to be overly onerous and costly for low intensity dryland farming and as a result, no dryland farmer has voluntarily complied with the requirements of Rule 10.1 to date. Farmers indicated during consultation that the proposed requirements of Rule 10.1A are much more likely to be complied with as the cost of compliance is minimal. Farmers also indicated that farm management plan requirements are likely to be complied with because farmers can see a direct benefit to farm management.

05 collectives and catchment accounting (options for collectives and nutrient loss reporting...).
Jenkins, L. 26 March 2018

07 accounting and collectives and update on offsetting. Jenkins, L. 16 April 2018

08 accounting and collectives. Jenkins, L. 21 May 2018

09 collectives and accounting recommendations. Jenkins, L. 16 July 2018

Effectiveness of options for achieving Objectives 5.1 and 5.2

The proposed plan change is likely to be as effective as the status quo in achieving the Objectives of the HWRRP.

The status quo has been determined to be overly onerous for dryland farming⁷⁵ and as a result, the CRC and the Hurunui Waiau community have not implemented the framework as it relates to dryland farms⁷⁶. Plan Change 1 proposes a more equitable framework for dryland farmers that is commensurate with the degree of environmental risk posed by dryland farming in the Hurunui Waiau zone.

Plan Change 1, in conjunction with the nitrogen offset agreement anticipated to be reached with irrigators, will have the result of at least maintaining water quality within limits set for the attainment of the plan objectives, and at best, improving water quality in the Hurunui river. To that end, Plan Change 1 will be as effective as the status quo at achieving the objectives of the Plan

Effectiveness of options for achieving the purpose of the Plan Change

The purpose of the Plan Change is to reduce the regulatory burden on low impact dryland farming while:

- Achieving a regulatory framework for dryland farming that is commensurate with established low environmental impact
- Giving effect to NPSFM requirements to maintain or improve water quality
- Giving effect to NPSFM requirements to account for nutrient losses at a Freshwater Management Unit (catchment) level; and
- Encouraging the implementation of farm management practices, particularly for the management of phosphorus and sediment loss

A regulatory framework commensurate with low environmental impact is provided for by the proposed plan change. In particular, the removal of the 10% cap on increases in nutrient losses recognises that greater variation in loss rates is a component of normal dryland farming and that overall, losses from normal dryland farming are low.

The proposed plan change will provide for the maintenance of water quality as increases in nutrient losses are to be offset by reductions in nutrient losses from irrigated farms⁷⁷, while farm management plans are intended to ensure phosphorus and sediment run-off is avoided.

NPS requirements for catchment accounting are addressed by the proposed provisions requiring dryland farmers to report the area of winter grazing undertaken each year.

⁷⁵ An Assessment of the Efficiency and Effectiveness of the Hurunui and Waiau River Regional Plan. White, L. 2018

⁷⁶ Advice Note: Dryland farming and triggering the land use change rules in the Hurunui and Waiau River Regional Plan (HWRRP). Environment Canterbury. 2015

⁷⁷ Detail pending

The proposed plan change encourages management of phosphorus and sediment run-off through the requirement for farmers to prepare and implement a farm plan and provide that farm plan to CRC staff on request.

Benefits and Costs

The Council's evaluation of the benefits and costs of the proposed amendments to the provisions which manage the cumulative effects of land use on water quality is summarised below. The evaluation undertaken is a comparative assessment against the status quo. While Council officers have identified that the existing provisions in the HWRRP do not have a high level of compliance, for the purposes of this assessment, the assessment against the status quo assumes full compliance with the existing plan provisions unless stated otherwise.

Environmental

Compared to the status quo (fully implemented), the proposed plan change is anticipated to have, at worst, a neutral impact on the environment. Phosphorus and sediment run-off will not increase as farm management plans will encourage the implementation of practices to avoid run-off. Additional N load in the Hurunui catchment will be offset by irrigators. Additional N in the Waiau Uwha catchment from dryland farming is not anticipated to be significant enough to cause periphyton growth to reach or exceed limits. It is not anticipated that there will be additional N in the Jed catchment⁷⁸.

Benefits

Because the proposed plan change is well supported by dryland farmers⁷⁹, dryland farmers have told us they are more likely to comply with the provisions that are less onerous than the status quo. To date, there has not been wide uptake of farm management plans by dryland farmers because the auditing requirements of the HWRRP are considered to be overly onerous. Farmers have indicated, in discussion at community meetings held in Waikari and Cheviot, that they are more likely to prepare and implement a farm plan if the plan can be used as a farm management tool rather than a tool to grade farm performance. Having a permitted activity rule with reduced administrative requirements and associated costs is likely to have higher compliance than the existing provisions. The proposed amendments would require management plans be prepared for low intensity dryland farms which outlines the management practices that will be undertaken to minimise the effects of the activity on water quality. Preparing and implementing management plans will drive implementation of phosphorus and sediment management practices.

Requirements to report winter grazing area will mean the CRC will have a better understanding of land use activities in the catchment, enabling better informed catchment planning for any future review of the provisions in the HWRRP.

⁷⁸ Evidence pending

⁷⁹ Zone Committee planning paper 09 collectives and accounting recommendations. Jenkins, L 2018.

As described in Norton's 2018 memo⁸⁰, the potential environmental effects were assessed based on a "plausible worst case" scenario whereby winter grazing area on dryland farms would increase by as much as 50% above average in any given year (note, it is not considered likely such an increase is plausible on a continual basis). This assessment identified a potential 14% increase in dryland losses from current land use, or an additional 4% increase from what is anticipated under the status quo. In the Hurunui catchment, off-setting the N load from a "plausible worst case" increase in winter grazing area could result in an overall reduction in N load if the worst case is not realised.

Costs

Because the proposed plan change requires farmers to have and implement a farm management plan that includes identification of phosphorus loss and run-off management practices, it is not anticipated that the proposed plan change will result in additional phosphorus or other contaminants entering water. However, because farm plans prepared in accordance with Schedule 2A are not proposed to be audited, there is a risk that some better farm practices may not be identified or implemented. Regardless, a farm management plan is a useful educational tool and a starting point for CRC officers to work with land managers to improve practice if run-off does occur.

The "plausible worst case" estimate of approximately 14% increase in nitrogen losses from dryland farms in the Waiau Uwha catchment is slightly greater than the worst case 10% increase allowed under the current permitted activity "10% rule" provisions. This amounts to, at worst, approximately a 3% increase in total catchment nitrogen load at the Waiau Uwha mouth⁸¹.

The HWRRP does not set nutrient load limits for the Waiau Uwha River and the nutrient loads necessary to achieve periphyton limits in the Waiau Uwha River have not been technically determined; this is a matter that has been signalled by the Zone Committee and Environment Canterbury to be addressed in a subsequent process⁸² and new periphyton monitoring in the lower Waiau mainstem (SH1) has been initiated in 2018 to assist with this future purpose.

In the meantime, it is assessed as unlikely that the additional N entering the Waiau Uwha River will have a significant impact on periphyton growth in the Waiau river and it is not anticipated that the proposed plan change will cause periphyton limits in the Waiau Uwha River to be reached or exceeded. This is supported by the Dynes and Norton memo⁸³ which found that the Waiau Uwha mainstem shows a low susceptibility for nuisance periphyton growth due to the frequency of

⁸⁰ Estimating the 'plausible worst case' increase in nitrogen load from a new way of permitting 'normal dryland farming' that would need to be offset by decreases elsewhere in order to stay within the Hurunui Waiau River Regional Plan (HWRRP) nitrogen load limit. Norton, N. 2018

⁸¹ What do we know about future nutrient losses in the Waiau catchment from both irrigated and dryland development, and under different assumed amounts of permitted winter grazing of forage crops? Norton, N. 29 January 2018.

⁸² August 2018 addendum to the Hurunui Waiau Zone Implementation Plan; and Zone Committee paper 06 Waiau WQ limits. Jenkins, L. March 2018

⁸³ What are the predicted environmental effects of a percent increase in nitrogen and phosphorus for the Waiau River catchment?

effective flushing flows. While increased nitrogen concentrations in the lower mainstem would technically increase the risk of periphyton growth during occasional periods of stable low flow, the increased risk from nutrients from dryland farming under the proposed Plan Change 1 is very small compared to the nutrient contributions from current and proposed irrigated development and would be unlikely to cause a breach of the periphyton limits without further irrigation development. At time of writing Emu Plains Irrigation is pursuing resource consent for further irrigation development and it is anticipated that the risk of combined effects of cumulative increases in nutrient losses will be assessed and tested in hearings for that process.

Overall environmental impact

Compared to the status quo (fully implemented), the proposed plan change is likely to result in additional N load reaching the Waiau Uwha river. It is not anticipated that the additional N Load in the Waiau Uwha will cause periphyton limits to be exceeded. In the Hurunui, Plan Change 1 will have a neutral, and potentially beneficial effect compared to the status quo as anticipated additional N load will be off-set by a reduction in load from irrigated land use.

Social

Benefits

The operative rule framework has led to significant social divide in the Hurunui district. When the HWRRP was made operative in 2013, it became clear to dryland farmers that a 10% cap on nutrient losses would effectively mean they were locked into operating as they were in 2013, while farmers with irrigation could increase their irrigated area or intensify stock numbers. Dryland farmers at the time considered they had been locked out of future opportunities and were being unfairly constrained because irrigated farmers had “maxed out” the assimilative capacity of the environment, while dryland farming had not intensified significantly for 150 years. Irrigated farmers on the other hand had made significant investment in infrastructure and were (and still are) committed to minimising their effects on the environment. The inequity perceived by both irrigated and non-irrigated farmers culminated in the two sectors being unable to come to a satisfactory solution and there continues to be tension between the sectors.

The proposed plan change will assist in reducing that tension. Dryland farmers will be better enabled to “just get on and farm” because irrigated farmers have committed to reducing their N load⁸⁴. It is likely that, once the wider mitigation package including relinquishment of offset load is confirmed and implemented, that some degree of partial mending of the social rift will result.

The proposed Plan Change will also likely improve relationships between farmers and the Canterbury Regional Council. A reduction in what farmers consider to be overly onerous regulation by the CRC will build trust and provide opportunities for CRC to engage with farmers in a proactive manner, rather than in a compliance oriented manner.

⁸⁴ Detail Pending

Costs

A part of the perceived inequity stems from the concept of “grandparenting”. “Grandparenting” refers to the practice of holding landowners to limits that reflect past use. A high emitting land use is enabled to continue to emit at a high rate, while low emitting land uses are required to remain low emitters. Some consider this system to be inherently unfair to low emitters. Even though the proposed plan change undoubtedly makes a significant movement towards more equitable distribution, there is a risk that, because the proposed plan change does not introduce a new system where nutrient loss rights are distributed equally, lower emitters will continue to perceive the framework to be inequitable.

Overall social impact

Overall, the proposed plan change is anticipated to assist in improving social cohesion.

Cultural

Cultural benefits and costs are those that relate to the customs, values and beliefs of people and communities, particularly Ngāi Tahu. These considerations can be specific or holistic in nature and often correlate with changes in environmental, economic, social or spiritual conditions.

Plan Change 1 was prepared taking into consideration key issues raised by Ngāi Tahu, iwi and hapū in their iwi management plans that are relevant to the Hurunui Waiau zone and an assessment of how Plan Change 1 provides for the outcomes sought in Iwi Management Plans has been provided below.

Benefits

Plan Change 1 includes a requirement for farm management plans to be developed and implemented. Included in the matters to be addressed in a farm management plan is the consideration of the protection of mahinga kai values. In conjunction with the Zone Implementation work programme that includes the provision of cultural land management advice, it is anticipated that Plan Change 1 will have the result of enhancing mahinga kai values in the zone. It should be noted that improved relationships between farmers and the CRC will likely lead farmers to being more willing to engage with the CRC cultural land management advisory officer.

Costs

A key issue raised in the iwi management plans is the effect on the mauri of water resources and the impact on mahinga kai, taonga and other indigenous species as a result of poor water quality, particularly from land use and discharge activities. Because there is likely to be a small increase in Nitrogen load in the Waiau Uwha river, there could be some impact on the overall mauri of the Waiau Uwha catchment. However, the limits set in the Plan for the Waiau Uwha river are set at a level determined, through the plan development process in 2009-2013, to provide for the protection of mauri within the Waiau Uwha and Hurunui rivers. Because Plan Change 1 will not result in water quality limits being exceeded, it is likely the mauri of water in the Waiau Uwha will be maintained. In addition, because water quality in the Hurunui river will remain within limits or improve, the overall effect of Plan Change 1 on the Mauri of the Hurunui river will be neutral.

Assessment of the extent to which Plan Change 1 provides for outcomes sought in Iwi Management Plans

Issues	Outcomes sought by Ngāi Tahu	Assessment of how Plan Change 1 provides for the outcomes sought by Ngāi Tahu
<p>Kaitiakitanga</p> <p>Limited recognition of kaitiakitanga in resource management processes and decision making.</p>	<p>Recognition for the role of Ngāi Tahu as kaitiaki and engagement with Ngāi Tahu in the spirit and intent of the Treaty of Waitangi (Te Tiriti o Waitangi) and the RMA.</p>	<p>The exercise of Plan Change 1 does not provide any additional opportunities for Ngāi Tahu as kaitiaki in the management of permitted Low Intensity Dryland Farming activities.</p> <p>The CWMS process, under which Plan Change 1 has been developed, includes opportunity for Ngāi Tahu to contribute to decision making and direction setting processes as kaitiaki.</p>
<p>Land use & infrastructure</p> <p>Discharge activities associated with land use and development, and effects on the mauri of water and soil resources.</p>	<p>Protection of Ngāi Tahu cultural values and associations from inappropriate use and development.</p> <p>Avoidance of discharges to water and those discharges to land where such discharges will have adverse effects on the mauri of the land.</p> <p>Promotion for the development of best practice guidelines to manage surface run off of contaminants.</p>	<p>Plan Change 1 enables existing low intensity dryland farming activities to operate as permitted activities, subject to conditions, where all farms are required to prepare and implement a farm environment plan which includes a list of farm practices and the actions that the farmer has undertaken, including practices that manage surface runoff of contaminants and practices that can contribute to the protection of mahinga kai values.</p> <p>Where a dryland farming activity does not meet definition of “low intensity dryland farming” or the conditions of Rule 10.1A, resource consent is required as a restricted discretionary or non-complying activity under Rules 11.1 and 11.1A. In both these instances, the council is able to consider methods required to avoid, remedy or mitigate adverse effects arising from issues managed under the FEP or Dryland Farmer Collective Agreement, having regard to (amongst other things) Objective 5.1. Objective 5.1 of the HWRRP seeks to manage concentrations of nutrients entering the mainstems of the Hurunui, Waiau and Jed rivers to “...(a) protect the mauri of the waterbodies”.</p>

Issues	Outcomes sought by Ngāi Tahu	Assessment of how Plan Change 1 provides for the outcomes sought by Ngāi Tahu
		Outcomes sought by Ngāi Tahu in relation to land use and infrastructure are provided for in Plan Change 1 by the requirement to prepare a farm management plan that identifies the practices to manage surface run off, and seek protection of mahinga kai values, and by retaining a consent pathway where the council is able to specifically consider the protection of mauri of the waterbodies.
<p>Fresh Water</p> <p>The impact on mahinga kai, taonga and other indigenous species as a result of poor water quality and insufficient water quantity.</p> <p>Discharges to water (point and non-point source) and the effects on surface and groundwater quality, cultural and intrinsic values of importance to tangata whenua.</p> <p>Effects of land use on water resources, including rivers, streams, wetlands, groundwater, waipuna and riparian areas.</p>	<p>Management of water resources according to the philosophy and principle of Ki Uta Ki Tai, including the unimpeded passage of water from the mountains to the sea.</p> <p>Restoration, maintenance and protection of the mauri of freshwater and mahinga kai.</p> <p>Avoidance of discharges (point and non-point source) to water and discharges to land where such discharges will have adverse effects on the mauri of the water.</p> <p>Maintenance and enhancement of water quality where required.</p> <p>Protection, restoration and enhancement of native riparian vegetation to provide habitat for taonga species and a buffer against intensive land use.</p>	<p>The implementation of the wider solutions package (which includes the provisions contained in proposed Plan Change 1, the Zone Team work programme and the offsetting of additional N load in the Hurunui river) will ensure that the existing water quality will be maintained within limits set in the Plan. The nutrient limits in the operative HWRRP are set at a level to ensure concentrations in the Hurunui river do not adversely affect a number of values including the protection of mauri. The wider HWRRP implementation package is anticipated to enhance cultural wellbeing through the protection of mauri and mahinga kai values⁸⁵.</p> <p>Plan Change 1 seeks to retain the consent pathway for activities that do not meet the permitted activity conditions, which enables the consent authority to consider methods to protect mauri via the consent process.</p> <p>Under proposed Rule 10.1A, all low intensity dryland farms will be required to prepare and implement a FMP, which includes protection of mahinga kai values, and the maintenance of vegetated riparian margins of a sufficient width to minimise nutrient, sediment and microbial pathogen losses</p>

⁸⁵ Hurunui Waiau River Regional Plan Section 32 Report, October 2011; pp 53-54

Issues	Outcomes sought by Ngāi Tahu	Assessment of how Plan Change 1 provides for the outcomes sought by Ngāi Tahu
		to waterbodies. There is no requirement to protect, restore or enhance native riparian vegetation in either the HWRRP or proposed PC1, as these matters sit outside the scope of the proposed PC and the activities administered by the HWRRP.
Coastal Environment Discharges to coastal waters and impacts on coastal water quality.	Avoidance of contaminant discharges to coastal waters.	The proposed permitted activity framework for Low Intensity Dryland Farming activities and the wider solutions package does not seek to alter the attainment of water quality limits in the HWRRP. The HWRRP does not cover discharges to the coastal environment, this is dealt with by the Regional Coastal Environment Plan for the Canterbury Region.
Soil Loss of soil qualities/effects on mauri of soils as result of discharge to land activities. Human induced soil erosion.	Avoidance of human induced soil erosion. The mauri and life supporting capacity of soils is safeguarded.	Plan Change 1 does not specifically safeguard the mauri or life supporting capacity of soils. The farming activities that are permitted by Rule 10.1A are required to prepare and implement a FMP that sets out the actions that will be undertaken to maintain vegetated margins to minimise sediment loss (among other things) to waterways. While the practices specified in the FMP do not extend to the management of soils more generally, management of critical source areas for phosphorus loss and other run-off management will include some degree of erosion avoidance or mitigation.

Economic

Benefits

Dryland farming systems rely on the ability to make small adjustments to be resilient to climate conditions and respond to market conditions⁸⁶.

⁸⁶ Likely trends for dryland farming as a permitted activity in the Hurunui Waiau Zone. Brown, J. 2018

The proposed amendments, when compared to the status quo, would result in a reduction in the on-farm costs, for dryland farmers, associated with meeting the provisions in the plan.

The proposed plan change removes the requirement for dryland farmers to prepare OVERSEER™ budgets. OVERSEER™ budgets are estimated to cost between \$2000 and \$3000 per farm per year. The proposed plan change will likely save up to \$625 000 across 250 sheep and beef farms in the Hurunui Waiau Zone per year.

Providing for dryland farmer collectives that are not required to audit farm practices will also save significant costs to farmers when compared to the status quo. While it is unknown what the cost of auditing dryland farm practice across 250 farms would be, the Canterbury Regional Council understands that Amuri Irrigation Company employs at least one full time employee to undertake this work across 157⁸⁷ farms within the Amuri command area. A full-time employee will likely cost an organisation at least \$100 000 per year (salary plus expenses, plant and equipment). To cover all dryland farms, 2 full time employees would likely be necessary at a cost of \$200 000 per year. The cost per farm for auditing farm practice would likely be around \$1000 per farm per year plus farmer time. The proposed plan change reduces compliance costs to dryland farmers by around \$1000 per year.

Having flexibility to vary stocking rates and winter grazing area will provide dryland farmers with better economic certainty. Flexibility to incorporate some winter grazing into a farm system will enable additional stock carrying capacity through winter. Removal of the 10% nutrient loss increase cap will enable farmers to change stock ratios or stock type to respond to market conditions.

Costs

Relative to the status quo, there are unlikely to be any increase to the economic costs associated with the proposed provisions.

Overall economic impact

The proposed plan change is likely to result in an overall economic benefit.

Efficiency

The proposed plan change will likely result in greater social and economic benefits than the status quo. The proposed Plan Change is at worst neutral, but potentially positive with regard to environmental impact in the Hurunui catchment. Plan Change 1 may result in a small increase in N load in the Waiau Uwha river, but will maintain water quality within limits that will achieve the objectives of the Plan. Plan Change 1 will provide a cultural benefit in the enhancement of mahinga kai values but may also have a small impact on mauri in the Waiau Uwha river, despite maintaining water quality within limits set to protect mauri. Overall, the proposed plan change will achieve the Objectives of the HWRRP more efficiently than the status quo.

⁸⁷ AIC presentations Collectives and GMP 19 April 2017

Conclusion

Examination of the options for reducing the regulatory burden for dryland farmers operating as a permitted activity has resulted in the development of Proposed Plan Change 1 to the HWRRP. The purpose of the proposed plan change is appropriate for promoting the sustainable management of natural and physical resources. The proposed plan provisions are the most efficient and effective option for achieving the Objectives of the HWRRP and the purpose of the plan change.

DRAFT

Appendix 1: Legal and planning context

The following documents (or sections of documents) are not specifically required to be assessed in a s32 evaluation report. They are, however, relevant to Plan Change 1 and have been considered through the plan development process.

Resource Management Act 1991

As the overarching statutory document that provides the regulatory framework for developing regional plans there are number of relevant sections within the RMA. The following sections are relevant to Plan Change 1:

Part 2

Part 2 of the Act contains the purpose, principles, and matters that resource management in New Zealand must address.

Section 5 sets out the purpose:

- (1) The purpose of this Act is to promote the sustainable management of natural and physical resources.
- (2) In this Act, sustainable management means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while—
 - (a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and
 - (b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and
 - (c) avoiding, remedying, or mitigating any adverse effects of activities on the environment.

Section 6 sets out the matters of national importance that must be recognised and provided for. The matters relevant to Plan Change 1 are:

- the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga;
- the protection of protected customary rights.

Section 7 sets out other matters that must be given particular regard. The matters relevant to Plan Change 1 are:

- kaitiakitanga;
- the ethic of stewardship;
- the efficient use and development of natural and physical resources;
- the maintenance and enhancement of amenity values;
- intrinsic values of ecosystems;
- maintenance and enhancement of the quality of the environment;
- any finite characteristics of natural and physical resources;
- the protection of the habitat of trout and salmon.

Section 8 also requires that the principles of the Treaty of Waitangi (Te Tiriti o Waitangi) are taken into account when exercising any functions or powers (including plan development) under the RMA.

Part 3

Part 3 sets out what persons may or may not do in relation to the use of the land, the use of beds of lakes and rivers, the take and use of water, and discharges into the environment.

- Under Section 9, no person may use land in a manner that contravenes a regional rule unless the use is expressly allowed by a resource consent; or is an activity allowed by section 20A.
- Under Section 13, no person may use, construct or demolish any structure in a lake or river bed, nor excavate, deposit, reclaim or drain any lake or riverbed, unless expressly allowed by a national environmental standard, a rule in a regional plan, or resource consent.
- Under Section 14, no person may take, use, dam or divert any water, unless expressly allowed by a national environmental standard, a rule in a regional plan, a resource consent, or is taken for reasonable needs in accordance with s14(3)(b).

Part 4

Section 30 of the Act sets out the functions of regional councils. These functions are extensive, including a wide range of matters that relate to both land use and water. Those relevant to Plan Change 1 include:

- the establishment, implementation, and review of objectives, policies, and methods to achieve integrated management of the natural and physical resources of the region;
- the preparation of objectives and policies in relation to any actual or potential effects of the use, development, or protection of land which are of regional significance;
- the control of the use of land for the purpose of the maintenance and enhancement of the quality of water in water bodies and coastal water, the maintenance of the quantity of water in water bodies and coastal water, and the maintenance and enhancement of ecosystems in water bodies and coastal water;
- the control of discharges of contaminants into or onto land, air, or water and discharges of water into water;
- if appropriate, the establishment of rules in a regional plan to allocate any of the following: the taking or use of water (other than open coastal water), the taking or use of heat or energy from water (other than open coastal water), the taking or use of heat or energy from the material surrounding geothermal water, and the capacity of air or water to assimilate a discharge of a contaminant;
- the establishment, implementation, and review of objectives, policies, and methods for maintaining indigenous biological diversity.

'Control' means the Council has statutory authority to regulate activities, and, if necessary, to enforce these rules against individuals or organisations.

Part 5

Sections 65 to 70 set out a number of technical and procedural matters to be followed in the preparation of a regional plan. Of particular note are the following:

- The preparation of a regional plan, and any change to it, must be carried out in the manner set out in Schedule 1 (s 65(2)&(5)).
- There are particular circumstances where the Council must consider the desirability of preparing a regional plan, including any use of land that has actual or potential adverse effects on water quality (s 65(3)).
- When changing a regional plan, the Council must have regard to management plans and strategies prepared under other Acts, and take into account any relevant planning document recognised by an iwi authority, to the extent that their content has a bearing on the resource management issues of the region (ss 66(2)(c)(i) & (2A)(a)).
- A regional plan must set out objectives, policies and rules (if any) (s 67(1)). There are a number of optional matters that may be included, including issues, explanations, reasons and environmental results expected.
- A regional plan must give effect to any national policy statement, the New Zealand Coastal Policy Statement and any regional policy statement (s 67(3)).
- A regional plan must not be inconsistent with a water conservation order, or another regional plan for the region (s 67(4)).

Sections 68-70 contain specific requirements about the application of regional rules, including those relating to water quality and discharges.

Section 32

Section 32 of the RMA sets out the requirements for preparing and publishing evaluation reports. Section 32 states:

32 Requirements for preparing and publishing evaluation reports

(1) An evaluation report required under this Act must—

- a) examine the extent to which the objectives of the proposal being evaluated are the most appropriate way to achieve the purpose of this Act; and*
- b) examine whether the provisions in the proposal are the most appropriate way to achieve the objectives by—*
 - (i) identifying other reasonably practicable options for achieving the objectives; and*
 - (ii) assessing the efficiency and effectiveness of the provisions in achieving the objectives; and*
 - (iii) summarising the reasons for deciding on the provisions; and*
- c) contain a level of detail that corresponds to the scale and significance of the environmental, economic, social, and cultural effects that are anticipated from the implementation of the proposal.*

(2) An assessment under subsection (1)(b)(ii) must—

- a) identify and assess the benefits and costs of the environmental, economic, social, and cultural effects that are anticipated from the implementation of the provisions, including the opportunities for—*
 - (i) economic growth that are anticipated to be provided or reduced; and*

- (ii) employment that are anticipated to be provided or reduced; and
- b) if practicable, quantify the benefits and costs referred to in paragraph (a); and
- c) assess the risk of acting or not acting if there is uncertain or insufficient information about the subject matter of the provisions.

(3) If the proposal (an **amending proposal**) will amend a standard, statement, national planning standard, regulation, plan, or change that is already proposed or that already exists (an **existing proposal**), the examination under subsection (1)(b) must relate to—

- a) the provisions and objectives of the amending proposal; and
- b) the objectives of the existing proposal to the extent that those objectives—
 - (i) are relevant to the objectives of the amending proposal; and
 - (ii) would remain if the amending proposal were to take effect.

(4) If the proposal will impose a greater or lesser prohibition or restriction on an activity to which a national environmental standard applies than the existing prohibitions or restrictions in that standard, the evaluation report must examine whether the prohibition or restriction is justified in the circumstances of each region or district in which the prohibition or restriction would have effect.

(4A) If the proposal is a proposed policy statement, plan, or change prepared in accordance with any of the processes provided for in [Schedule 1](#), the evaluation report must—

- a) summarise all advice concerning the proposal received from iwi authorities under the relevant provisions of [Schedule 1](#); and
- b) summarise the response to the advice, including any provisions of the proposal that are intended to give effect to the advice.

(5) The person who must have particular regard to the evaluation report must make the report available for public inspection—

- a) as soon as practicable after the proposal is made (in the case of a standard or regulation); or
- b) at the same time as the proposal is notified.

(6) In this section,—
objectives means,—

- a) for a proposal that contains or states objectives, those objectives;
- b) for all other proposals, the purpose of the proposal

proposal means a proposed standard, statement, national planning standard, regulation, plan, or change for which an evaluation report must be prepared under this Act

provisions means,—

- a) for a proposed plan or change, the policies, rules, or other methods that implement, or give effect to, the objectives of the proposed plan or change;

- b) for all other proposals, the policies or provisions of the proposal that implement, or give effect to, the objectives of the proposal.*

Canterbury Regional Policy Statement 2013

Under section 67(3)(c) of the RMA, a regional plan must give effect to any regional policy statement. The Canterbury Regional Policy Statement 2013 (CRPS) sets out a policy framework for the management of natural resources in the Canterbury Region, including the region's freshwater resources. The freshwater chapter of the CRPS (Chapter 7) contains four objectives which specifically relate to the management of fresh water. These state that the region's freshwater resources are sustainably managed in an integrated way, taking into account a range of specified matters, including specific consideration of the effects of land uses and intensification on water quality, so that the region's overall water quality is maintained or improved. The objectives are implemented through 13 policies and their accompanying methods.

The CRPS policies of particular relevance to Plan Change 1 include:

- Establishing and implementing minimum water quality standards appropriate for each water body and managing land use activities to maintain water quality at or above these standards (Policy 7.3.6)
- Avoiding any additional discharge of contaminants that may further adversely affect water quality if the receiving water quality is below the minimum water quality standard (Policy 7.3.6(3))
- Managing the effects of land use change on water quality by identifying catchments where water quality may be adversely affected by increases in the application of nutrients to land or other land use changes, and controlling these changes to ensure water quality standards are met (Policy 7.3.7).
- Maintaining the natural character of braided rivers, including the Hurunui River (Policy 7.3.2)

The ECan Act 2016

The Environment Canterbury (Transitional Governance Arrangements) Act 2016 (the "ECan Act 2016") came into force on 10 May 2016. One of the key purposes of the ECan Act 2016 is to provide for the continuation of some of the modified processes that operated under the ECan Act 2010 to further progress issues relating to the management of fresh water in the Canterbury region. Section 24 of the ECan Act 2016 directs that the CRC, in considering any proposed regional policy statement or freshwater plan, must have particular regard to the vision and principles of the CWMS, in addition to the matters relevant under the RMA, when making its decisions under clause 10(1) of Schedule 1 to the RMA. Under the ECan Act 2016 a proposed freshwater plan includes a proposed change to any plan that has been notified by the Canterbury Regional Council under clause 5 of Schedule 1 of the RMA at any time before the date of the 2019 election, and relates to the management of freshwater in the Canterbury region (section 20(1)(a)). Plan Change 1 meets this definition. In preparing Plan Change 1, particular regard has been given to the vision and principles of the CWMS.

The Canterbury Water Management Strategy

The CWMS is a non-statutory document which provides the framework for land and water management across the Canterbury region. It was developed through an extensive collaborative process and endorsed by all councils in Canterbury. A decision maker may also have regard to the CWMS as a whole as a relevant consideration. The CWMS is not a "strategy prepared under other Acts", in terms of section 66(2)(c)(i) of the RMA, and so is not a mandatory consideration under that section. However, section 66(2)(c) does not create an exhaustive list of considerations. The High Court has held that regard may be had to non-binding national policy documents, as relevant background material, even if those documents do not have any status under the RMA.⁸⁸

Section 24 of the ECan Act 2016 adds some additional criteria for decision making. The Council must have particular regard to the vision and principles of the CWMS, in addition to the matters relevant under the RMA, when coming to a decision on the proposed plan change and matters raised in submissions.

The CWMS vision, principles and targets have been incorporated into the CRPS where appropriate. The CWMS vision is: *"To enable present and future generations to gain the greatest social, economic, recreational and cultural benefits from our water resources within an environmentally sustainable framework."*

The CWMS vision is underpinned by three primary principles and six supporting principles. The three primary principles are:

1. Sustainable management:

- Water is a public resource which must be managed in accordance with sustainability principles and be consistent with the Resource Management and Local Government Acts.

2. Regional approach:

- The planning of natural water use is guided by the following:
 - first order priority considerations: the environment, customary uses, community supplies and stock water.
 - second order priority considerations: irrigation, renewable electricity generation, recreation, tourism and amenity.
- A consistent regulatory approach to water is applied throughout the Canterbury region, recognising these principles.
- Both surface and groundwater are given equal importance.
- Further development of scientific knowledge of the region's water resources and the impacts of climate change are given priority.
- The actual or potential cumulative effects the taking and using water can have on waterways are recognised and managed within defined standards.
- A cautious approach is taken when information is uncertain, unreliable or inadequate.

⁸⁸ *West Coast Regional Council v The Friends of Shearer Swamp* [2012] NZRMA 45

- The need for efficient use of water in existing and new infrastructure is recognised.
- There is strong emphasis on the integration of water and land management including protection of indigenous biodiversity and enhancement of water quality.
- Current and potential effects of land use intensification is an integral part of decision-making on water takes. This may mean amending regional and district plans.

3. Kaitiakitanga:

- The exercise of kaitiakitanga by Ngāi Tahu applies to all water and lakes, rivers, hapua, waterways and wetlands, and shall be carried out in accordance with tikanga Māori.

The six supporting principles are:

1. Natural character:

- The natural character (mauri) of Canterbury's rivers, streams, lakes, groundwater and wetlands is preserved and enhanced.
- Natural flow regimes of rivers are maintained and, where they have been adversely affected by takes, enhanced where possible.
- The dynamic processes of Canterbury's braided rivers define their character and are protected.
- Environmental flow regimes are established for every waterway where abstraction occurs.
- That restoration of natural character and biodiversity, is a priority for degraded waterways, particularly lowland streams and lowland catchments.
- The interdependence of waterways and coastal ecosystems is recognised.

2. Indigenous biodiversity:

- Indigenous flora and fauna and their habitats in rivers, streams, lakes, groundwater and wetlands are protected and valued.
- The aims of the Canterbury Biodiversity Strategy are recognised and supported.

3. Access:

- Public access to and along rivers, lakes, waterways and wetlands is maintained and, where appropriate, enhanced. Access may need to be limited in situations including where environmental risk, public safety, security of assets, cultural values, biodiversity and farm management require.

4. Quality drinking water:

- All those living in Canterbury have access to high quality drinking water.
- The region's high-quality aquifer-sourced drinking water is protected.
- Where Canterbury's drinking water is currently untreated and safe for drinking, it is maintained at that high standard.

5. Recreational and amenity opportunities:

- Rivers, lakes, groundwater and wetlands provide opportunities for enjoyment, recreation and tourism.
- High quality water ensures contact recreation such as swimming, fishing, boating and other water sports are able to be enjoyed throughout Canterbury.
- Adequate environmental flows should ensure that recreational users and tourists can enjoy Canterbury rivers.
- Eco-tourism opportunities are recognised and encouraged.

6. Community and commercial use:

- Water resources are used sustainably to enhance quality of life.
- Where water is abstracted, it is used effectively and efficiently.
- Land use, industry and business practices do not adversely impact on natural water quality.
- Discharges to waterways are minimised and do not compromise quality.
- Land use practices are monitored, and best practice approaches are required.
- Agricultural stock is excluded from all waterways in catchments where irrigated farming is practised and all lowland streams.
- Where acclimatised wildlife in lowland streams cause contamination, they are appropriately managed.
- Degraded waahi taonga are enhanced to restore tangata whenua cultural wellbeing.

The CWMS sets out goals for 2010, 2015, 2020 and 2040 in ten target areas: ecosystem health and biodiversity; natural character of braided rivers; kaitiakitanga; drinking water; recreational and amenity opportunities; water-use efficiency; irrigated land area; energy security and efficiency; regional and national economies; and environmental limits. These targets embody the concept of “parallel development” - making progress on all targets, so that all aspects of the solution are advanced in parallel.

Ten zone committees, covering the Canterbury Region, are responsible for developing water management programmes that give effect to the CWMS targets in their respective areas. A regional committee is responsible for issues that are common across the region or cannot be managed satisfactorily at zone level.

In preparing Plan Change 1, the Council has had particular regard to the vision and principles of the CWMS and regard to the CWMS as a whole.

The National Policy Statement for Freshwater 2014

The NPSFM came into effect on 1 August 2014, replacing the previous 2011 version. It directs that a sustainable, integrated approach is taken to managing land use and fresh water. Council must recognise the national significance of fresh water for all New Zealanders and Te Mana o Te Wai (the mana of the water). Specifically, in relation to water quality, it directs the CRC to:

- Safeguard fresh water’s life supporting capacity, ecosystem processes, and indigenous species including their associated ecosystems.
- Manage freshwater bodies so people’s health is safeguarded.
- Maintain or improve the overall quality of fresh water within the Canterbury region.

- Avoid the over allocation of freshwater, and phase out existing over allocation.
- Set freshwater objectives according to a specified process (the national objectives framework) to meet community and tāngata whenua values which include the compulsory values of ecosystem health and human health for recreation.
- Use a specified set of water quality measures (attributes) to set the freshwater objectives and only set an objective below national bottom lines in specified circumstances.
- Set water quantity and quality limits to meet the freshwater objectives.

The NPSFM was amended in 2017 and placed some extra requirements on councils. The requirements relevant to Plan Change 1 include:

- Mandatory targets for making rivers and lakes safe for primary contact (i.e., swimmable) by 2040. The targets apply to all rivers that are bigger than fourth order (order is determined by the number of tributaries that a river has), and lakes with perimeters more than 1.5 km.
- Water quality in all freshwater bodies must be improved for human health (as measured by the levels of *E. coli* and planktonic cyanobacteria) regardless of their size.
- A requirement to set instream concentrations and exceedance criteria of dissolved inorganic nitrogen (DIN) and dissolved reactive phosphorus (DRP) in rivers to help achieve freshwater objectives for periphyton.
- A requirement, when setting freshwater nutrient concentrations for periphyton, to appropriately consider nutrient sensitive downstream receiving environments (e.g., lakes or estuaries).
- A requirement to consider and recognise Te Mana o te Wai in freshwater management.
- A requirement to consider economic well-being as part of freshwater management decisions.

Council must take reasonable steps to involve iwi and hapū in freshwater management, and to ensure that tāngata whenua values and interests are identified and reflected in the management of, and decision making regarding, fresh water and freshwater ecosystems in the region. Further, NPSFM requires the CRC to put in place measures, from 1 August 2016, to tally water takes and sources of contaminants, and to monitor progress towards meeting freshwater objectives and limits.

The NPSFM allows CRC until 2025 (or 2030 if they have reason) to fully implement all its policies. The CRC has adopted and publicly notified a Progressive Implementation Programme setting out a time-staged programme for implementing the policies of the NPSFM in the Canterbury Region.

Ngāi Tahu Claims Settlement Act 1998

The statutory acknowledgement for Hoka Kura (Lake Sumner) and Hurunui River is detailed in Schedule 3 of Section 5.4 of the HWRRP.

Canterbury Land and Water Regional Plan

Under section 67(4)(b) of the RMA, Plan Change 1 must not be inconsistent with any other regional plan for the region. The Canterbury Land and Water Regional Plan (LWRP) identifies the resource management objectives at a regional level for managing land and water resources in Canterbury to achieve the purpose of the RMA. The LWRP provides a policy and rule framework to achieve the

objectives of the plan and provides direction in terms of the processing of resource consent applications.

Iwi Management Plans

Section 66(2A)(a) of the RMA requires the regional council to take into account any relevant planning document that is recognised by an iwi authority and that is lodged with the Regional Council. The relevant iwi management plans for Plan Change 1 that have been lodged with the CRC are:

- Te Whakatau Kaupapa: Ngāi Tahu Resource Management Strategy for the Canterbury Region (1990)
- Te Rūnanga o Ngāi Tahu Freshwater Policy Statement (1999)
- Mahaanui Iwi Management Plan 2013 (February 2013)
- Te Puhu o Tohu Raumati: Te Rūnanga o Kaikōura Environmental Management Plan 2007

In preparing Plan Change 1, the Council has taken these documents into account. The key issues concerning water quality and the outcomes sought by Ngāi Tahu, iwi and hapū are summarised in the following table. In general, it is the iwi's desire that the region's freshwater resources are acknowledged as a taonga, the cultural values associated with fresh water are protected, and that degraded water bodies are restored.

More effective management of discharges (including non-point source discharges) to water and their adverse effects on fresh water quality, ecosystems and cultural values are consistent themes through all of the iwi management plans. Among the measures proposed in these iwi management plans to manage non-point source discharges, are the use of best management practices, farm management plans, riparian planting and buffer zones, setting appropriate conditions on resource consents, and monitoring and reporting on the effectiveness of these measures.

	Issues	Outcomes sought by Ngāi Tahu
Kaitiakitanga	<ul style="list-style-type: none">• Limited recognition of kaitiakitanga in resource management processes and decision making.	<ul style="list-style-type: none">• Recognition for the role of Ngāi Tahu as kaitiaki and engagement with Ngāi Tahu in the spirit and intent of the Treaty of Waitangi (Te Tiriti o Waitangi) and the RMA.
Land use & infrastructure	<ul style="list-style-type: none">• Discharge activities associated with land use and development, and effects on the mauri of water and soil resources.	<ul style="list-style-type: none">• Protection of Ngāi Tahu cultural values and associations from inappropriate use and development.• Avoidance of discharges to water and those discharges to land where such discharges will have adverse effects on the mauri of the land.• Promotion for the development of best practice guidelines to

		manage surface run off of contaminants.
Fresh Water	<ul style="list-style-type: none"> • The impact on mahinga kai, taonga and other indigenous species as a result of poor water quality and insufficient water quantity. • Discharges to water (point and non-point source) and the effects on surface and groundwater quality, cultural and intrinsic values of importance to tangata whenua. • Effects of land use on water resources, including rivers, streams, wetlands, groundwater, waipuna and riparian areas. 	<ul style="list-style-type: none"> • Management of water resources according to the philosophy and principle of Ki Uta Ki Tai, including the unimpeded passage of water from the mountains to the sea. • Restoration, maintenance and protection of the mauri of freshwater and mahinga kai. • Avoidance of discharges (point and non-point source) to water and discharges to land where such discharges will have adverse effects on the mauri of the water. • Maintenance and enhancement of water quality where required. • Protection, restoration and enhancement of native riparian vegetation to provide habitat for taonga species and a buffer against intensive land use.
Coastal Environment	<ul style="list-style-type: none"> • Discharges to coastal waters and impacts on coastal water quality. 	<ul style="list-style-type: none"> • Avoidance of contaminant discharges to coastal waters.
Soil	<ul style="list-style-type: none"> • Loss of soil qualities/effects on mauri of soils as result of discharge to land activities. • Human induced soil erosion. 	<ul style="list-style-type: none"> • Avoidance of human induced soil erosion. • The mauri and life supporting capacity of soils is safeguarded.

Appendix 2: Supporting documents and reference material

Topic	Document	Author/Date	Notes
Social	Hurunui Waiau Healthy Rivers, Productive Land: Social Community Profile Assessment	Chris Bowie, Lisa Early and Vivienne Ivory. September 2017	Final report prepared for Environment Canterbury
Economics	Capacity for the Canterbury Regional Council and industry to efficiently process consents that would be required from dryland farmers under the "10% rule"	Lisa Jenkins, December 2017	Internal memorandum
	Hurunui zone limit setting process: Economic assessment of the current state	Simon Harris, August 2017	Draft report prepared for Environment Canterbury
	AIC presentations Collectives and GMP 19 April 17	AIC, April 2017	Presentation by AIC
	Overview of the Sheep and Beef farming in Hurunui	Beef + Lamb New Zealand. 2018	Presentation by Beef + Lamb New Zealand
Water quality – current state	What we know... about water quality in the Hurunui catchment: Results from current monitoring and investigations	Kimberley Dynes, Hamish Graham, Ned Norton, 20 March 2017	Presentation at a public meeting hosted by the Hurunui Waiau Zone Committee, Waikari
	What do we currently know?... about surface water quality... & land use... in the Hurunui catchment: Gathering current knowledge with the Science Stakeholder Group: 8 March 2017, Waipara	Kimberley Dynes, Adrian Meredith, Hamish Graham, Ned Norton, Ognjen Mojsilovic, 8 March 2017	Presentation to Hurunui SSG Workshop
	Hurunui catchment groundwater quality	Hamish Graham, 15 February 2017	Presentation to Hurunui SSG Workshop
	What we know... about water quality in the Hurunui and Waiau River catchments: Results from current monitoring and investigations	Ned Norton, Kimberley Dynes, Hamish Graham, 19 June 2017	Presentation at a public meeting hosted by the Hurunui Waiau Zone Committee, Cheviot
	What do we currently know?... about surface water quality... & land use... in the Waiau River catchment: Gathering current knowledge with the Science Stakeholder Group: 16 November 2016, Amberley	Kimberley Dynes, Adrian Meredith, Maureen Whalen, Hamish Graham, Ned Norton, Ognjen Mojsilovic, 16 November 2016	Presentation to Hurunui SSG Workshop
Water Quality - general	Hurunui River recreational water quality summary 2016/17	Kimberley Dynes & Jarred Arthur, 18 September 2017.	Environment Canterbury Memo
	Hurunui River at State Highway 7: faecal source tracking 2017/18	Jarred Arthur, 8 August 2018	Environment Canterbury Memo
	The rise of toxic benthic <i>Phormidium</i> proliferations: A review of their taxonomy,	Tara G. McAllister, Susanna A. Wood, Ian Hawes. 2016	Published research paper in journal <i>Harmful Algae</i>

Topic	Document	Author/Date	Notes
	distribution, toxin content and factors regulating prevalence and increased severity		
	<i>Phormidium</i> accrual cycles in Canterbury rivers: relative effects of flow and nutrients	Tara McAllister, 15 February 2017	Presentation to Hurunui SSG Workshop
	Periphyton in relation to nutrients and flows in the Hurunui River – January to May 2015	Cathy Kilroy and Janine Wech, 1 February 2017	Presentation to Hurunui SSG Workshop
	Spatial and temporal patterns in nutrient concentrations and periphyton in the Hurunui River – January to May 2015	Cathy Kilroy and Janine Wech, September 2015	NIWA Client Report No. CHC2015-086
Water Quality – Waiau limits	Presentation Predicted environmental effects of nutrient increases Waiau (7Feb2018)	Kimberley Dynes, 7 February 2018	Presentation to Hurunui SSG Workshop
	What are the predicted environmental effects of a percent increase in nitrogen and phosphorus for the Waiau River catchment?	Kimberley Dynes and Ned Norton, 2 February 2018	Environment Canterbury Memo (Draft)
	06 Waiau WQ limits March 2018	Lisa Jenkins, March 2018	Zone Committee Paper
	What do we know about future nutrient losses in the Waiau catchment...	Ned Norton, January 2018	Zone Committee workshop presentaiton
Phosphorus	Technical progress update: 1) Dryland farming related information, including estimating potential for forage cropping; 2) Outstanding questions on deferral of water takes issue	Ned Norton, 20 November 2017	Paper to a meeting of the Hurunui Waiau Zone Committee
	Technical progress update presentation 1) dryland farming 2) Flow deferral (20Nov2017)	Ned Norton, 20 November 2017	Presentation to Hurunui Waiau Zone Committee Meeting
	Sources of manageable phosphorus losses in the Hurunui and Waiau catchments	Adrian Meredith, 8 November 2017	Presentation to Hurunui SSG Workshop
	Amuri Irrigation nutrient loads and management	Peter Brown, 1 November 2017	Amuri Irrigation memorandum
Environmental flows & allocations	Environmental consequences of continuing delay to implementing HWRRP minimum flows	Graeme Clark, Jeanine Topélen, Ned Norton, Suzanne Gabites, Hamish Graham, 16 October 2017	Paper to a meeting of the Hurunui Waiau Zone Committee
	Implications of further HWRRP minimum flow deferral on ecological values	Graeme Clark, Jeanine Topélen, Ned Norton, Kimberley Dynes, Suzanne Gabites, Hamish Graham, 16 October 2017	Presentation to a meeting of the Hurunui Waiau Zone Committee

Topic	Document	Author/Date	Notes
	Hydrological change from implementing HWRRP minimum flows	Peter Brown, 25 September 2017	Amuri Irrigation memorandum
	How might climate change impact on Hurunui flow assessment?	Suzanne Gabites and Jeanine Topélen, 20 November 2017	Paper to a meeting of the Hurunui Waiau Zone Committee
	Irrigation reliability	Mark Everest, 4 December 2017	Paper prepared by Macfarlane Rural Business
	On-farm impact of irrigation restrictions	Peter Brown, 4 December 2017	Amuri Irrigation memorandum
	Actions to improve water quality and biodiversity	Amuri Irrigation Company, 20 November 2017	Presentation to Zone Committee in relation to implementation of minimum flows.
Resource consent (nutrient allocation) decisions	Amuri Irrigation Landuse consent decision	Canterbury Regional Council, August 2015	
	Report and decision of hearing commissioners in relation to Hurunui Water Project scheme consents	Canterbury Regional Council, August 2013	
	Report and decision of hearing commissioners in relation to Ngai Tahu Forest Estates Balmoral consents	Canterbury Regional Council, July 2014	
Development of approach to identify N load required to offset dryland farming “10% rule” fix	Nitrogen Concentrations and loads in the Hurunui River at SH1	Aqualinc, March 2016	
	Summary of process to estimate the nitrogen load increase that would need to be offset in the Hurunui catchment as part of fixing the dryland farming “10% rule” issue	N. Norton; 12 April 2018	Environment Canterbury Memo
	Estimating the ‘plausible worst case’ increase in nitrogen load from a new way of permitting ‘normal dryland farming’, that would need to be offset by decreases elsewhere in order to stay within the Hurunui Waiau River Regional Plan (HWRRP) nitrogen load limit	N. Norton; 16 March 2018	Zone Committee Meeting Paper
	What is the risk of increase to the area of winter grazing of forage crops if “normal dryland farming” is permitted?	N. Norton (7 March 2018)	Presentation to Hurunui SSG Workshop
	What is the “plausible worst case” increase in N load from permitting “normal dryland farming” – and thus what tonnage needs offsetting to	N. Norton (7 March 2018)	Presentation to Hurunui SSG Workshop

Topic	Document	Author/Date	Notes
	stay within the Hurunui catchment N load limit		
	Modelling changes in Hurunui and Waiau catchment root zone nitrogen losses from hypothetical scenarios of permitted winter forage development	O. Mojsilovic (25 Jan 2018)	Memo appended to paper by N. Norton (29 Jan 2018) presented to a meeting of the Hurunui SSG and Zone Committee
	What do we know about future nutrient losses in the Waiau catchment from both irrigated and dryland development, and under different assumed amounts of permitted winter grazing of forage crops?	N. Norton (29 Jan 2018)	Paper presented to a meeting of the Hurunui SSG and Zone Committee
	Likely trends of dryland farming as a permitted activity in the Hurunui and Waiau Zone (In the context of water quality discussions).	J. Brown (Feb 2018)	Final report
	Technical progress update: 1) Dryland farming related information, including estimating potential for forage cropping; 2) Outstanding questions on deferral of water takes issue	N. Norton (20 Nov 2017)	Zone Committee Meeting Paper
	Estimates of area for winter forage crops in Hurunui and Waiau catchments	O. Mojsilovic (6 Nov 2017)	Environment Canterbury Memo
	Hurunui and Waiau catchment nutrient calculators	P. Brown (6 Nov 2017)	Memo to ECan and the Hurunui SSG
	Amuri Irrigation nutrient loads and management	P. Brown (1 Nov 2017)	Memo to ECan and the Hurunui SSG
	Hurunui River nutrient modelling: impact of dryland intensification".	P. Brown (15 March 2015)	Memo to the Hurunui, Waiau and Jed Nutrient Working Group
	A survey of dairy cow wintering practices in Canterbury, New Zealand	J. P. Edwards, K. Mashlan, D. E. Dalley and J. B. Pinxterhuis. 2016.	
HWRRP	An Assessment of the Efficiency and Effectiveness of the Hurunui and Waiau River Regional Plan	Liz White, February 2018	draft
	Advice Note: Dryland farming and triggering the land use change rules in the Hurunui and Waiau River Regional Plan (HWRRP)	Environment Canterbury, July 2015	
	Commissioners recommendation report on the HWRRP	Canterbury Regional Council, April 2013	

Topic	Document	Author/Date	Notes
Consultation material	Consultation Booklet_ Farm Plans and catchment accounting June 2018	Canterbury Regional Council, June 2018	
	Fixing the 10% Rule issues and options	Canterbury Regional Council, October 2017	
Zone Committee planning papers (other than those listed under other topic headings)	01 Targeted planning approach March 2017	Lisa Jenkins, March 2017	Zone Committee Paper
	02 Options for making dryland farming a permitted activity August 2017	Lisa Jenkins, August 2017	Zone Committee Paper
	03 Plan options for making dryland a permitted activity January 2018	Lisa Jenkins, January 2018	Zone Committee Paper
	04 Dryland farming and offsets recommendations March 19 2018	Lisa Jenkins, March 2018	Zone Committee Paper
	05 collectives and catchment accounting March 2018	Lisa Jenkins, March 2018	Zone Committee Paper
	07 accounting and collectives and update on offsetting April 2018	Lisa Jenkins, April 2018	Zone Committee Paper
	08 accounting and collectives May 2018	Lisa Jenkins, May 2018	Zone Committee Paper
	09 collectives and accounting recommendations July 2018	Lisa Jenkins, July 2018	Zone Committee Paper
CWMS process	The Preferred Approach for Managing the Cumulative Effects of Land Use on Water Quality in the Canterbury Region: A Working Paper	Environment Canterbury, 2012	
Science Stakeholder Group meeting notes	00 TOR Hurunui Science Stakeholder Group 18 Oct 16		
	01 Hurunui SSG meeting notes 20 Oct 16		
	02 Hurunui SSG meeting notes 16 Nov 16		
	03 Hurunui SSG meeting notes 30 Nov 16		
	04 Hurunui SSG meeting notes 01 Feb 17		
	05 Hurunui SSG meeting notes 15 Feb 17		
	06 Hurunui SSG meeting notes (Waipara) 08 Mar 16		
	07 Hurunui SSG meeting notes 19 Apr 17		
	08 Hurunui SSG meeting notes 08 Nov 17		
	09 Hurunui SSG meeting notes 07 Feb 18		
	10 Hurunui SSG meeting notes 07 Mar 18		
Implementation	Hurunui Waiau Zone Implementation Programme July 2011	Hurunui Waiau Water Management Zone Committee. July 2011	

Topic	Document	Author/Date	Notes
	August 2018 Addendum to the Hurunui Waiau Zone Implementation Programme	Hurunui Waiau Water Management Zone Committee. August 2018	
	10 Review of Zone Delivery Work Programme	Paul Hulse and Ian Brown, March 2018	Zone Committee Workshop Paper

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